REPORT TO

ERILYAN

ON

PRELIMINARY (STAGE 1) SITE INVESTIGATION – CONTAMINATION ASSESSMENT AND WASTE CLASSIFICATION

FOR

PROPOSED COMMERCIAL DEVELOPMENT

AT

CORNER KELLICAR AND CAMDEN ROADS, CAMPBELLTOWN, NSW

Date: 30 September 2020
Ref: E33438PLrpt

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Executive Summary

Erilyan ('the client') commissioned JK Environments (JKE) to undertake a Preliminary (Stage 1) Site Investigation (PSI) and Waste Classification for the proposed commercial development at the corner of Kellicar and Camden Roads, Campbelltown, NSW ('the site'). The site location is shown on Figure 1 and the investigation was confined to the site boundaries as shown on Figure 2.

This report has been prepared to support the lodgement of a Development Application (DA) for the proposed development.

JKE understand that the proposed development includes construction of a medical facility containing radiation/oncology, medical imaging and consultations rooms. The building will be constructed in the south-eastern portion of the site and does not include any basement levels. The remaining areas of the site will include a car park and landscaping. The site may also be sub-divided.

The primary aims of the investigation were to identify any past or present potentially contaminating activities at the site, identify the potential for site contamination, provide a preliminary waste classification for soil, and make a preliminary assessment of the soil contamination conditions. The objectives were to:

- Provide an appraisal of the past site use(s) based on a review of historical records;
- Assess the current site conditions and use(s) via a site walkover inspection;
- Identify potential contamination sources/areas of environmental concern (AEC) and contaminants of potential concern (CoPC);
- Assess the soil contamination conditions via implementation of a preliminary sampling and analysis program;
- Prepare a conceptual site model (CSM);
- Assess the potential risks posed by contamination to the receptors identified in the CSM (Tier 1 assessment);
- Provide a preliminary waste classification for off-site disposal of soil;
- Assess whether the site is suitable or can be made suitable for the proposed development (from a contamination viewpoint); and
- Assess whether further intrusive investigation and/or remediation is required.

The scope of work included the following:

- Review of site information, including background and site history information from various sources outlined in the report;
- Preparation of a CSM;
- Design and implementation of a sampling, analysis and quality plan (SAQP);
- Interpretation of the analytical results against the adopted Site Assessment Criteria (SAC);
- Data Quality Assessment; and
- Preparation of a report including a Tier 1 risk assessment.

The site has historically been used for grazing/agricultural purposes from at least 1911 up until 1980, prior to being gradually purchased by Campbelltown City Council. The historical aerial photographs indicated that several buildings and structures were demolished over this time. Since 1980, the site has been cleared and re-purposed as a public recreation area and is maintained as such to the present day.

The investigation identified bonded asbestos containing material (ACM) in the form of one fibre cement fragment (FCF) which was encountered in fill/soil in BH2. Asbestos was also detected in the fill/soil sample from BH7 (0.1-0.2m) in what the laboratory reported as "matted material" (see Figure 3). The asbestos/ACM is considered most likely to be

associated with historical demolition of structures at the site, and based on the current data it is our opinion that the matted asbestos material in BH7 is likely to be associated with degraded fibre cement.

Given that no visible ACM was identified at the ground surface and the grass cover was reasonably good across the site, the potential for airborne asbestos fibres to be generated and for exposure to airborne asbestos to occur under the current site conditions is considered to be relatively low. There is considered to be a high potential for asbestos/ACM to be present (and widespread) due to the historical demolition of residential buildings in multiple locations, therefore further investigation is required.

All other CoPC were reported at low concentrations (all below the SAC) or at levels below the laboratory detection limits. On this basis, and considering the site history, the primary CoPC to be considered in further detail include asbestos/ACM and lead (both of which are of most concern considering the historical demolition activities).

JKE are of the opinion that the site can be made suitable for the proposed development described in Section 1.1. A Detailed Site Investigation (DSI) is required to address the data gaps outlined in Section 10.4 and to facilitate the preparation of a Remediation Action Plan (RAP) and/or Asbestos Management Plan (AMP). The DSI is to include the following:

- Additional soil sampling from 26 locations for asbestos quantification of asbestos/ACM in fill (this should include grid-based sampling across the site using an excavator). Identified ACM is to be submitted to a laboratory for confirmatory analysis, along with gravimetric analysis of selected soil samples; and
- Additional soil sampling and analysis of the fill and natural soil from at least eight of these locations to confirm the waste classification and provide additional characterisation for the identified CoPC.

If remediation for asbestos is required, remediation strategies may include excavation and off-site disposal of contaminated soils and/or capping and containment of material on site. The contamination identified to date is well suited to a capping/containment approach and would pose a negligible risk to future site users if the approach is implemented adequately. These options would be further evaluated following the DSI.

Based on the PSI data, the fill/topsoil was assigned a preliminary classification of 'general solid waste (non-putrescible' containing special waste (asbestos)' for waste disposal purposes.

The conclusions and recommendations should be read in conjunction with the limitations presented in the body of this report.

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Attachments

Abbreviations

Asbestos Fines/Fibrous Asbestos	**AF/FA**
Ambient Background Concentrations	**ABC**
Added Contaminant Limits	**ACL**
Asbestos Containing Material	**ACM**
Australian Drinking Water Guidelines	**ADWG**
Area of Environmental Concern	**AEC**
Australian Height Datum	**AHD**
Acid Sulfate Soil	**ASS**
Above-Ground Storage Tank	**AST**
Below Ground Level	**BGL**
Benzo(a)pyrene Toxicity Equivalent Factor	**BaP TEQ**
Bureau of Meteorology	**BOM**
Benzene, Toluene, Ethylbenzene, Xylene	**BTEX**
Cation Exchange Capacity	**CEC**
Contaminated Land Management	**CLM**
Contaminant(s) of Potential Concern	**CoPC**
Chain of Custody	**COC**
Conceptual Site Model	**CSM**
Development Application	**DA**
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Data Quality Indicator	**DQI**
Data Quality Objective	**DQO**
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Health Investigation Level	**HILs**
Hardness Modified Trigger Values	**HMTV**
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International Organisation of Standardisation	**ISO**
JK Environments	**JKE**
Lab Control Spike	**LCS**
Light Non-Aqueous Phase Liquid	**LNAPL**
Map Grid of Australia	**MGA**
National Association of Testing Authorities	**NATA**
National Environmental Protection Measure	**NEPM**
Organochlorine Pesticides	**OCP**
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Site Audit Report	**SAR**
Site Specific Assessment	**SSA**
Source, Pathway, Receptor	**SPR**
Specific Contamination Concentration	**SCC**
Standard Penetration Test	**SPT**
Standing Water Level	**SWL**
Trip Blank	**TB**
Toxicity Characteristic Leaching Procedure	**TCLP**
Total Recoverable Hydrocarbons	**TRH**
Trip Spike	**TS**
Upper Confidence Limit	**UCL**
United States Environmental Protection Agency	**USEPA**
Underground Storage Tank	**UST**
Virgin Excavated Natural Material	**VENM**
Volatile Organic Compounds	**VOC**
World Health Organisation	**WHO**
Work Health and Safety	**WHS**

Units

Litres	**L**
Metres BGL	**mBGL**
Metres	**m**
Millivolts	**mV**
Millilitres	**ml or mL**
Milliequivalents	**meq**
micro Siemens per Centimetre	**µS/cm**
Micrograms per Litre	**µg/L**
Milligrams per Kilogram	**mg/kg**
Milligrams per Litre	**mg/L**
Parts Per Million	**ppm**
Percentage	**%**

1 INTRODUCTION

Erilyan ('the client') commissioned JK Environments (JKE) to undertake a Preliminary (Stage 1) Site Investigation (PSI) and Waste Classification for the proposed commercial development at the corner of Kellicar and Camden Roads, Campbelltown, NSW ('the site'). The purpose of the investigation is to make a preliminary assessment of site contamination and provide a preliminary waste classification for soil waste that may be generated during the proposed development works. The site location is shown on Figure 1 and the investigation was confined to the site boundaries as shown on Figure 2.

This report has been prepared to support the lodgement of a Development Application (DA) for the proposed development.

A geotechnical investigation was undertaken in conjunction with this investigation by JK Geotechnics (JKG). The results of the geotechnical investigation are presented in a separate report (Ref: 33438Arpt)[1]. This report should be read in conjunction with the JKG report.

1.1 Proposed Development Details

The proposed development includes construction of a medical facility containing radiation/oncology, medical imaging and consultations rooms. The building will be constructed in the south-eastern portion of the site and does not include any basement levels. The remaining areas of the site will include a car park and landscaping. The site may also be sub-divided.

1.2 Aims and Objectives

The primary aims of the investigation were to identify any past or present potentially contaminating activities at the site, identify the potential for site contamination, provide a preliminary waste classification for soil, and make a preliminary assessment of the soil contamination conditions. The objectives were to:

- Provide an appraisal of the past site use(s) based on a review of historical records;
- Assess the current site conditions and use(s) via a site walkover inspection;
- Identify potential contamination sources/areas of environmental concern (AEC) and contaminants of potential concern (CoPC);
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- Provide a preliminary waste classification for off-site disposal of soil;
- Assess whether the site is suitable or can be made suitable for the proposed development (from a contamination viewpoint); and
- Assess whether further intrusive investigation and/or remediation is required.

[1] JKG, (2020). *Report to Erilyan on Geotechnical Investigation at Cnr Kellicar and Camden Road, Campbelltoen, NSW.* (referred to as JKG report)

1.3 Scope of Work

The investigation was undertaken generally in accordance with a JKE proposal (Ref: EP52313P) of 24 July 2020 and written acceptance from the client of 20 August 2020. The scope of work included the following:

- Review of site information, including background and site history information from various sources outlined in the report;
- Preparation of a CSM;
- Design and implementation of a sampling, analysis and quality plan (SAQP);
- Interpretation of the analytical results against the adopted Site Assessment Criteria (SAC);
- Data Quality Assessment; and
- Preparation of a report including a Tier 1 risk assessment.

The scope of work was undertaken with reference to the National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)[2], other guidelines made under or with regards to the Contaminated Land Management Act (1997)[3] and State Environmental Planning Policy No.55 – Remediation of Land (1998)[4]. A list of reference documents/guidelines is included in the appendices.

[2] National Environment Protection Council (NEPC), (2013). *National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013).* (referred to as NEPM 2013)

[3] Contaminated Land Management Act 1997 (NSW) (referred to as CLM Act 1997)

[4] *State Environmental Planning Policy No. 55 – Remediation of Land 1998* (NSW) (referred to as SEPP55)

2 SITE INFORMATION

2.1 Background

A geotechnical investigation was previously undertaken by Geotechnique Pty Ltd in 2017[5]. The investigation included one borehole location within the site boundary and two boreholes nearby, outside the site boundary. The boreholes encountered shallow topsoil to a maximum depth of 0.2m below ground level (BGL), underlain by natural alluvial clay soils. Shale bedrock was encountered in all boreholes at depths of between approximately 5.8mBGL to 7.1mBGL. Groundwater was encountered during drilling in all boreholes at depths of between approximately 3.5mBGL to 5.0m BGL.

2.2 Site Identification

Table 2-1: Site Identification

Current Site Owner (certificate of title):	Campbelltown City Council
Site Address:	Cnr Kellicar and Camden Roads, Campbelltown, NSW
Lot & Deposited Plan:	Lot 1 in DP883417
Current Land Use:	Public Open Space
Proposed Land Use:	Commercial Development (Genesis Care Medical Facility)
Local Government Authority:	Campbelltown City Council
Current Zoning:	B4: Mixed Use
Site Area (m^2) (approx.):	4,744m^2
RL (AHD in m) (approx.):	66-68
Geographical Location (decimal degrees) (approx.):	Latitude: -34.071297 Longitude: 150.80588
Site Location Plan:	Figure 1
Sample Location Plan:	Figure 2
Site Contamination Plan:	Figure 3

2.3 Site Location and Regional Setting

The site is located in a predominantly commercial and residential area of Campbelltown and is bound by Kellicar Road to the south-east and Camden Road to the south-west. The site is located approximately 70m west of Birunji Creek and approximately 90m south of Bow Bowing Creek.

[5] Geotechnique Pty Ltd, (2017). *Report to Campbelltown City Council on Geotechnical Investigation for Possible Commercial Development at Corner Kellicar and Camden Roads, Campbelltown, NSW.* (Ref: 14038/1-AA) (referred to as Geotechnique 2017)

2.4 Topography

The regional topography is an alluvial floodplain and is characterised by a hillside that falls gently toward the south-west. The site itself is located mid-slope of the hillside and falls gently to the south-west towards Buirunji Creek at approximately 3°.

2.5 Site Inspection

A walkover inspection of the site was undertaken by JKE on 25 August 2020. A summary of the inspection findings is outlined in the following subsections:

2.5.1 Current Site Use and/or Indicators of Former Site Use

At the time of the inspection, the site was vacant grassed land and used as a public reserve. There were no visible indicators of former land use at the time of the inspection.

2.5.2 Boundary Conditions, Soil Stability and Erosion

The site was fenced along the western boundary by a steel mesh fence. The remaining boundaries were open with no fencing. The site predominantly consisted of grass cover with minimal exposed soil at the surface. No signs of soil erosion were identified.

2.5.3 Presence of Drums/Chemical Storage and Waste

No evidence was identified of chemicals or waste being stored at the site.

2.5.4 Visible or Olfactory Indicators of Contamination (odours, spills etc)

Where bare soil was exposed at the surface, the material visually appeared to be fill/disturbed soil. No odours or visible staining was identified at the time of the inspection.

2.5.5 Drainage and Services

An open stormwater drain was located parallel to the northern site boundary which discharged directly into Birunji Creek. Surface water runoff was assumed to follow the general slope of the site towards the south-west.

2.5.6 Sensitive Environments

Birunji Creek was located approximately 70m south-west of the site. This creek feeds into a man-made duck pond and wetland area approximately 150m south-west of the site.

2.5.7 Landscaped Areas and Visible Signs of Plant Stress

The site was predominantly grassed with minor areas of exposed soil at the surface. Large exotic and native trees and shrubs were located along the western boundary and towards the northern corner of the site. No visible signs of plant stress or dieback was identified.

2.6 Surrounding Land Use

During the site inspection, JKE observed the following land uses in the immediate surrounds:

- North – Camden Road and Railway Line;
- South – Junction of Narellan and Kellicar Roads and Campbelltown Catholic Club beyond
- East – Camden Road and Campbelltown Library; and
- West – Narellan Road and Birunji Creek.

JKE did not observe any land uses in the immediate surrounds that were identified as potential contamination sources for the site.

2.7 Underground Services

The 'Dial Before You Dig' (DBYD) plans were reviewed for the investigation in order to establish whether any major underground services exist at the site or in the immediate vicinity that could act as a preferential pathway for contamination migration. Major services were not identified that would be expected to act as preferential pathways for contamination migration.

2.8 Section 10.7 Planning Certificate

The section 10.7 (2 and 5) planning certificates were reviewed for the investigation. Copies of the certificates are attached in the appendices. A summary of the relevant information is outlined below:

- The land is not deemed to be: significantly contaminated; subject to a management order; subject of an approved voluntary management proposal; or subject to an on-going management order under the provisions of the CLM Act 1997;
- The land is not the subject of a Site Audit Statement (SAS);
- The land is not located within an acid sulfate soil (ASS) risk area; and
- The land is not located in a heritage conservation area.

3 GEOLOGY AND HYDROGEOLOGY

3.1 Regional Geology

A review of the regional geological map of Wollongong-Port Hacking (1985)[6] indicated that the site is underlain by Quaternary alluvium, then Ashfield Shale of the Wianamatta Group.

3.2 Acid Sulfate Soil (ASS) Risk and Planning

A review of the acid sulfate soil (ASS) risk map prepared by Department of Land and Water Conservation (1997)[7] indicated that the site is not located in an area that has been mapped in relation to ASS risk.

A review of the Campbelltown Local Environmental Plan (LEP) 2015 also indicated the site is not located within an ASS risk area.

3.3 Hydrogeology

Hydrogeological information presented in the Water NSW online interactive groundwater map indicated that there were no registered bores within 500m of the site. There were approximately 11 groundwater bores within 1,000m of the site. Further information indicated:

- The nearest registered bore was located approximately 650m from the site. This was utilised for monitoring purposes;
- The majority of the bores were registered for monitoring purposes;
- There were no nearby bores (i.e. within 500m) registered for domestic or irrigation uses; and
- The drillers log information from the closest registered bores typically identified fill and/or clay soil to depths of 1.6-2.7m, underlain by shale (siltstone) bedrock. Standing water levels (SWLs) in the bores ranged from 3.0mBGL to 6.2mBGL.

The information reviewed for the investigation indicates that the subsurface conditions at the site are expected to consist of moderate to high permeability (alluvial) soils overlying relatively deep bedrock. Abstraction and use of groundwater at the site or in the immediate surrounds may be viable under these conditions, however the use of groundwater is not proposed as part of the development. There is a reticulated water supply in the area and consumption of groundwater is not expected to occur.

Considering the local topography and surrounding land features, JKE anticipate groundwater to flow towards the south-west.

3.4 Receiving Water Bodies

The site location and regional topography indicates that excess surface water flows have the potential to enter Birunji Creek located south-west of the site. This water body is a potential receptor.

[6] Department of Mineral Resources, (1983). *1:100,000 Geological Map of Wollongong-Port Hacking (Series 9029-9129)*

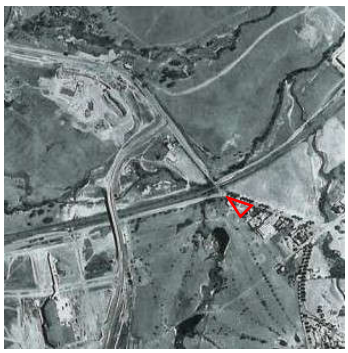
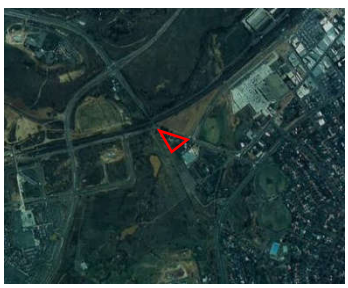
[7] Department of Land and Water Conservation, (1997). *1:25,000 Acid Sulfate Soil Risk Map (Series 9130N3, Ed 2)*

4 SITE HISTORY INFORMATION

4.1 Review of Historical Aerial Photographs

Historical aerial photographs were reviewed for the investigation. The information was sourced for the Lotsearch report. JKE has reviewed the photographs, and summarised relevant information in the following table:

Table 4-1: Summary of Historical Aerial Photographs

Year	Photo	Details
1947		**On-site:** The northern portion of the site appeared to contain a residential building with associated external structures (i.e. garage/shed). The southern portion of the site appeared be vacant and grassed (possibly used for grazing purposes). **Off-site:** The surrounds appeared similar to the site and consisted of small buildings and large areas of vacant grassed land most likely used for grazing. The railway line is already visible to the north of the site.
1970		**On-site:** Some areas in the southern portion of the site appeared to have been partially developed, with grassed cover no longer present and small buildings and/or driveways visible. **Off-site:** The surrounds immediately to the south-east of the site appeared to have been developed and additional buildings were visible. These appeared to be for residential purposes with potential uses as market garden and/or other agricultural uses in the general surrounds.
1979		**On-site:** The site features appeared generally similar to the previous photograph. **Off-site:** The immediate surrounds appeared generally similar to the previous photograph. New roads including Narellan Road had been constructed to the north of the site.
1984		**On-site:** The site appeared mostly vacant with the northern portion building demolished and replaced by trees. The southern/central portion appeared to contain some remaining structures or driveways. **Off-site:** The immediate surrounds appeared generally similar to the previous photograph. New buildings and warehouses were visible to the east of the site.

Year	Photo	Details
1994		**On-site:** The site appeared mostly vacant, with trees and vegetation evident along the northern boundary and corner. The former buildings and associated structures had been demolished. **Off-site:** The immediate surrounds appeared generally similar to the previous photograph. Campbelltown Library was visible to the east of the site. New buildings and warehouses had been constructed to the west of the site.
2002		The site and immediate surrounds appeared generally similar to the previous photograph.
2005		The site and immediate surrounds appeared generally similar to the present day.

4.2 Review of Historical Land Title Records

Historical land title records were reviewed for the investigation. The record search was undertaken by Advance Legal Searchers Pty Ltd. Copies of the title records are attached in the appendices. The title records indicate the following:

- The land was formerly divided into six sub-lots and each was privately owned by various individuals from as early as 1911;
- The owners had listed professions such as farmer, dairy farmer, textile worker, tailor, railway gatehouse keeper, and engine driver; and
- The sub-lots were gradually bought by Campbelltown City Council between 1980 and 1991 and the site has been owned by council to the present day.

From the historical land title records, the professions listed as farmers and/or dairy farmers may have taken place on-site (and/or in the general based on the historical aerial photographs) and may have resulted in contamination at the site through the use of pesticides and use/maintenance of machinery associated with agriculture. The remaining professions of the individuals listed on the title records are unlikely to be associated with site related activities.

4.3 Review of Council Records

A request to view council records in relation to historical activities, building and development applications/activities at the site was lodged with Campbelltown Council. A response had not been received at the date of issuing this report.

4.4 SafeWork NSW Records

SafeWork NSW records in relation to the registered storage of dangerous goods were reviewed for the investigation. Copies of relevant documents are attached in the appendices. The search did not identify any licences to store dangerous goods including underground fuel storage tanks (USTs), above ground storage tanks (ASTs) or chemicals at the site.

4.5 NSW EPA Records

A review of the NSW EPA online records for contaminated land and other licences was undertaken on 17 September 2020 for the PSI, including:

- Records maintained in relation to contaminated land under Section 58 of the CLM Act 1997;
- Records of sites notified in accordance with the Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015)[8]; and
- Licensed activities under the Protection of the Environment Operations Act (1997)[9].

A summary of the information is provided below:

Table 4-2: NSW EPA and Department of Defence Records

Records	On-site	Off-site
Records under Section 58 of the CLM Act 1997	None	There were three former notices listed for a single property located approximately 1,100m to the north-east of the site. The notices were for chemical storage. Due to the distance from the site, the property is not considered to represent an off-site source of contamination.
Records under the Duty to Report Contamination under Section 60 of the CLM Act 1997	None	None
Licences under the POEO Act 1997	None	None

4.6 Summary of Site History Information

A time line summary of the historical land uses and activities is presented in the following table. The information presented in the table is based on a weight of evidence assessment of the site history documentation and observations made by JKE.

[8] NSW EPA, (2015). *Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997.* (referred to as Duty to Report Contamination)

[9] Protection of the Environment Operations Act 1997 (NSW) (referred to as POEO Act 1997)

Table 4-3: Summary of Historical Land Uses / Activities

Year(s)	On-site - Potential Land Use / Activities	Off-site - Potential Land Use / Activities
1911-1980	The site was likely used for agricultural (grazing) purposes at various times during this period. The aerial photographs indicated various small-scale construction and demolition activities took place at the site, most likely associated with residential land uses.	The aerial photographs indicate the surrounds were mostly used for agricultural and residential purposes, with other construction activities/uses taking place further from the site from around the 1980s onwards.
1980-1991	The site was gradually bought by Campbelltown City Council. It was around this time the aerial photographs indicated the residential and ancillary buildings were demolished and the site became a public recreation area.	
1980-present day	The site was maintained as a public recreation area with grass and other vegetation.	

4.7 Integrity of Site History Information

The majority of the site history information was obtained from government organisations as outlined in the relevant sections of this report. The veracity of the information from these sources is considered to be relatively high. A certain degree of information loss can be expected given the lack of specific land use details over time. JKE have relied upon information contained on databases maintained by various government agencies and is expected to be reliable.

5 CONCEPTUAL SITE MODEL

NEPM (2013) defines a CSM as a representation of site related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM for the site is presented in the following sub-sections and is based on the site information (including the site inspection information) and the review of site history information. Reference should also be made to the figures attached in the appendices.

A review of the CSM in relation to source, pathway and receptor (SPR) linkages has been undertaken as part of the Tier 1 risk assessment process, as outlined in Section 10.

5.1 Potential Contamination Sources/AEC and CoPC

The potential contamination sources/AEC and CoPC are presented in the following table:

Table 5-1: Potential (and/or known) Contamination Sources/AEC and Contaminants of Potential Concern

Source / AEC	CoPC
Fill material – Portions of the site appear to have been historically filled to achieve a level base for construction of previous buildings. The fill may have been imported from various sources and could be contaminated.	Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), petroleum hydrocarbons (referred to as total recoverable hydrocarbons – TRHs), benzene, toluene, ethylbenzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), polychlorinated biphenyls (PCBs) and asbestos.
Historical agricultural use – The site appears to have been used for grazing and farming purposes. This could have resulted in contamination across the site via use of machinery, application of pesticides and building/ demolition of various structures. Underground pipework containing asbestos may have also been utilised.	Heavy metals, TRH, PAHs, OCPs, PCBs and asbestos JKE note that OCPs only became commercially available in the 1940s. Prior to this time pesticides were predominantly heavy metal compounds.
Hazardous Building Material – Hazardous building materials may be present as a result of former building and demolition activities. The historical aerial photographs indicated that various demolition activities have taken place in the northern and southern portions of the site.	Asbestos, lead and PCBs

5.2 Mechanism for Contamination, Affected Media, Receptors and Exposure Pathways

The mechanisms for contamination, affected media, receptors and exposure pathways relevant to the potential contamination sources/AEC are outlined in the following CSM table:

Table 5-2: CSM

Potential mechanism for contamination	The potential mechanisms for contamination are most likely to include 'top-down' impacts and spills. There is a potential for sub-surface releases to have occurred if deep fill (or other buried industrial infrastructure) is present, although this is considered to be the least likely mechanism for contamination.
Affected media	Soil has been identified as the potentially affected medium. The potential for groundwater impacts is considered to be relatively low. However, groundwater would need to be considered in the event significant contamination (i.e. high concentrations of mobile contaminants) was identified in soil.
Receptor identification	Human receptors include site occupants/users (including adults and children), construction workers and intrusive maintenance workers. Off-site human receptors include adjacent land users. Ecological receptors include terrestrial organisms and plants within unpaved areas, and freshwater ecology in Birunji Creek.
Potential exposure pathways	Potential exposure pathways relevant to the human receptors include ingestion, dermal absorption and inhalation of dust (all contaminants) and vapours (volatile TRH, naphthalene and BTEX). The potential for exposure would typically be associated with the construction and excavation works, and future use of the site. Potential exposure pathways for ecological receptors include primary/direct contact and ingestion. Exposure during future site use could occur via direct contact with soil in unpaved areas such as gardens, inhalation of airborne asbestos fibres during soil disturbance, or inhalation of vapours within enclosed spaces such as the future commercial building. Groundwater could migrate to Birunji Creek, however connectivity between the groundwater and the creek has not been confirmed by this investigation.
Potential exposure mechanisms	The following have been identified as potential exposure mechanisms for site contamination: • Vapour intrusion into the proposed building from volatilisation of soil contamination; • Contact (dermal, ingestion or inhalation) with exposed soils during construction works or in unpaved areas; and • Migration of groundwater off-site and into nearby water bodies, including aquatic ecosystems.

6 SAMPLING, ANALYSIS AND QUALITY PLAN

6.1 Data Quality Objectives (DQO)

Data Quality Objectives (DQOs) were developed to define the type and quality of data required to achieve the project objectives outlined in Section 1.2. The DQOs were prepared with reference to the process outlined in Schedule B2 of NEPM (2013) and the Guidelines for the NSW Site Auditor Scheme, 3rd Edition (2017)[10]. The seven-step DQO approach for this project is outlined in the following sub-sections.

The DQO process is validated in part by the Data Quality Assurance/Quality Control (QA/QC) Evaluation. The Data (QA/QC) Evaluation is summarised in Section 6.1 and the detailed evaluation is provided in the appendices.

6.1.1 Step 1 - State the Problem

The CSM identified potential sources of contamination/AEC at the site that may pose a risk to human health and the environment. Investigation data is required to assess the contamination status of the site, assess the risks posed by the contaminants in the context of the proposed development/intended land use, and assess whether remediation is required. This information will be considered by the consent authority in exercising its planning functions in relation to the development proposal.

A waste classification is required prior to off-site disposal of excavated soil/bedrock.

The DQOs were developed by the author of this report and checked by the reviewer. Both the author and reviewer were joint decision-makers in relation to Step 2 of the DQO process.

6.1.2 Step 2 - Identify the Decisions of the Study

The objectives of the investigation are outlined in Section 1.2. The decisions to be made reflect these objectives and are as follows:

- Did the site inspection, or does the historical information identify potential contamination sources/AEC at the site?
- Are any results above the SAC?
- Do potential risks associated with contamination exist, and if so, what are they?
- Is further investigation and/or remediation required?
- Is the site characterisation sufficient to provide adequate confidence in the above decisions?
- Is the site suitable for the proposed development, or can the site be made suitable subject to further characterisation and/or remediation?

6.1.3 Step 3 - Identify Information Inputs

The primary information inputs required to address the decisions outlined in Step 2 include the following:

- Existing relevant environmental data from previous reports;
- Site information, including site observations and site history documentation;

[10] NSW EPA (2017). *Guidelines for the NSW Site Auditor Scheme, 3rd ed.* (referred to as Site Auditor Guidelines 2017)

- Sampling of potentially affected media (soil);
- Observations of sub-surface variables such as soil type, photo-ionisation detector (PID) concentrations, odours and staining;
- Laboratory analysis of soils, and fibre cement for the CoPC identified in the CSM; and
- Field and laboratory QA/QC data.

6.1.4 Step 4 - Define the Study Boundary

The sampling will be confined to the site boundaries as shown in Figure 2 (spatial boundary). The sampling was completed on 25 August 2020 (temporal boundary). The assessment of potential risk to adjacent land users has been made based on data collected within the site boundary.

6.1.5 Step 5 - Develop an Analytical Approach (or Decision Rule)

6.1.5.1 Tier 1 Screening Criteria

The laboratory data will be assessed against relevant Tier 1 screening criteria (referred to as SAC), as outlined in Section 7. Exceedances of the SAC do not necessarily indicate a requirement for remediation or a risk to human health and/or the environment. Exceedances are considered in the context of the CSM and valid SPR-linkages.

For this investigation, the individual results have been assessed as either above or below the SAC. Statistical evaluation of the dataset via calculation of mean values and/or 95% upper confidence limit (UCL) values has not been undertaken due to the spatial distribution of the data and the number of samples submitted for analysis.

6.1.5.2 Field and Laboratory QA/QC

Field QA/QC included analysis of intra-laboratory duplicates and trip spike samples. Further details regarding the sampling and analysis undertaken, and the acceptable limits adopted, is provided in the Data Quality (QA/QC) Evaluation in the appendices.

The suitability of the laboratory data is assessed against the laboratory QA/QC criteria which is outlined in the attached laboratory reports. These criteria were developed and implemented in accordance with the laboratory's National Association of Testing Authorities, Australia (NATA) accreditation and align with the acceptable limits for QA/QC samples as outlined in NEPM (2013) and other relevant guidelines.

In the event that acceptable limits are not met by the laboratory analysis, other lines of evidence are reviewed (e.g. field observations of samples, preservation, handling etc) and, where required, consultation with the laboratory is undertaken in an effort to establish the cause of the non-conformance. Where uncertainty exists, JKE typically adopt the most conservative concentration reported (or in some cases, consider the data from the affected sample as an estimate).

6.1.5.3 Appropriateness of Practical Quantitation Limits (PQLs)

The PQLs of the analytical methods are considered in relation to the SAC to confirm that the PQLs are less than the SAC. In cases where the PQLs are greater than the SAC, a discussion of this is provided.

6.1.6 Step 6 – Specify Limits on Decision Errors

To limit the potential for decision errors, a range of quality assurance processes are adopted. A quantitative assessment of the potential for false positives and false negatives in the analytical results is undertaken with reference to Schedule B(3) of NEPM (2013) using the data quality assurance information collected.

Decision errors can be controlled through the use of hypothesis testing. The test can be used to show either that the baseline condition is false or that there is insufficient evidence to indicate that the baseline condition is false. The null hypothesis is an assumption that is assumed to be true in the absence of contrary evidence. For this investigation, the null hypothesis has been adopted which is that, there is considered to be a complete SPR linkage for the CoPC identified in the CSM unless this linkage can be proven not to (or unlikely to) exist. The null hypothesis has been adopted for this investigation.

6.1.7 Step 7 - Optimise the Design for Obtaining Data

The most resource-effective design will be used in an optimum manner to achieve the investigation objectives. Adjustment of the investigation design can occur following consultation or feedback from project stakeholders. For this investigation, the design was optimised via consideration of the various lines of evidence used to select the sample locations, the media being sampled, and also by the way in which the data were collected.

The sampling plan and methodology are outlined in the following sub-sections.

6.2 Soil Sampling Plan and Methodology

The soil sampling plan and methodology adopted for this investigation is outlined in the table below:

Table 6-1: Soil Sampling Plan and Methodology

Aspect	Input
Sampling Density	The sampling density for asbestos quantification in soil included sampling from three locations across the site (BH2, BH3 and BH8). This density was considered adequate to provide some preliminary data in the absence of any existing sub-surface data for the site. Samples for other contaminants were collected from eight locations as shown on the attached Figure 2 (it is noted that BH5 and BH6 were drilled off-site for geotechnical purposes). Based on the site area (4,744m^2), this number of locations corresponded to a sampling density of approximately one sample per 590m^2. The sampling plan was not designed to meet the minimum sampling density for hotspot identification, as outlined in the NSW EPA Contaminated Sites Sampling Design Guidelines (1995)[11] as the sample design was not probabilistic.

[11] NSW EPA, (1995), *Contaminated Sites Sampling Design Guidelines.* (referred to as EPA Sampling Design Guidelines 1995)

Aspect	Input
Sampling Plan	The sampling locations were positioned in accordance with the sample location plan provided by the client, designed to target specific locations for geotechnical purposes. This sampling plan was considered suitable to make a preliminary assessment of potential risks associated with the AEC and CoPC identified in the CSM, and assess whether further investigation is warranted.
Set-out and Sampling Equipment	Sampling locations were set out using a tape measure. In-situ sampling locations were checked for underground services by an external contractor prior to sampling. Samples were collected using a drill rig equipped with spiral flight augers (150mm diameter). Soil samples were obtained from a Standard Penetration Test (SPT) split-spoon sampler, and/or directly from the auger. Where asbestos quantification occurred, the bulk samples were collected from the auger and topped up using a shovel from the more surficial soils to increase the sample volume.
Sample Collection and Field QA/QC	Soil samples were obtained on 25 August 2020 in accordance with our standard field procedures. Soil samples were collected from the fill and natural profiles based on field observations. The sample depths are shown on the geotechnical borehole logs attached in the appendices. Samples were placed in glass jars with plastic caps and teflon seals with minimal headspace. Samples for asbestos analysis were placed in zip-lock plastic bags. During sampling, soil at selected depths was split into primary and duplicate samples for field QA/QC analysis. The field splitting procedure included alternately filling the sampling containers to obtain a representative split sample.
Field Screening	A portable Photoionisation Detector (PID) fitted with a 10.6mV lamp was used to screen the samples for the presence of volatile organic compounds (VOCs). PID screening for VOCs was undertaken on soil samples using the soil sample headspace method. VOC data was obtained from partly filled zip-lock plastic bags following equilibration of the headspace gases. PID calibration records are maintained on file by JKE. The field screening for asbestos quantification included the following: • A representative bulk sample was collected from the surface in BH2, BH3 and BH8; • Each sample was weighed using an electronic scale; • Each bulk sample was passed through a sieve with a 7.1mm aperture and inspected for the presence of fibre cement; • The condition of fibre cement or any other suspected asbestos materials, if encountered, was noted on the field records; and • If observed, any fragments of fibre cement in the bulk sample were collected, placed in a zip-lock bag and assigned a unique identifier. Calculations for asbestos content were undertaken based on the requirements outlined in Schedule B1 of NEPM (2013), as summarised in Section 7.1. A calibration/check of the accuracy of the scale used for weighing the fibre cement fragments was undertaken using a set of calibration weights. Calibration/check records are maintained on file by JKE. The scale used to weigh the 10L samples was not calibrated, however this is not considered significant as this method of providing a weight for the bulk sample is considered to be considerably more accurate than applying a nominal soil density conversion.

Aspect	Input
Decontami-nation and Sample Preservation	Sampling personnel used disposable nitrile gloves during sampling activities. Soil samples were preserved by immediate storage in an insulated sample container with ice. On completion of the fieldwork, the samples were stored temporarily in fridges in the JKE warehouse before being delivered in the insulated sample container to a NATA registered laboratory for analysis under standard chain of custody (COC) procedures.

6.2.1 Laboratory Analysis

Samples were analysed by an appropriate, NATA Accredited laboratory using the analytical methods detailed in Schedule B(3) of NEPM 2013. Analysis was undertaken on fill samples collected from BH2, BH3, BH4, BH7, BH8 and BH9 only. Reference should be made to the laboratory reports attached in the appendices for further details.

Table 6-2: Laboratory Details

Samples	Laboratory	Report Reference
All primary samples and field QA/QC samples including the intra-laboratory duplicate and trip spike	Envirolab Services Pty Ltd NSW, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	249821, 249821-A and 249821-B

7 SITE ASSESSMENT CRITERIA (SAC)

The SAC were derived from the NEPM 2013 and other guidelines as discussed in the following sub-sections. The guideline values for individual contaminants are presented in the attached report tables and further explanation of the various criteria adopted is provided in the appendices.

7.1 Soil

Soil data were compared to relevant Tier 1 screening criteria in accordance with NEPM (2013) as outlined below.

7.1.1 Human Health

- Health Investigation Levels (HILs) for a 'public open space; secondary schools; and footpaths' exposure scenario (HIL-C). Selection of this exposure setting is in accordance with the general philosophy of the NEPM (2013) in relation to hospitals and medical land uses where there is a potential for children to visit the site from time to time;
- Health Screening Levels (HSLs) for a 'commercial/industrial' exposure scenario (HSL-D);
- HSLs for direct contact (HSL-D) presented in the CRC Care Technical Report No. 10 – Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document (2011)[12]; and
- Asbestos was assessed against the HSL-C criteria where quantification occurred (see additional note in the table below regarding the 'detected/not detected' assessment). For laboratory analysis where quantification did not occur, the results were assessed as detected/not detected. A summary of the asbestos criteria is provided in the table below:

Table 7-1: Details for Asbestos SAC

Guideline	Applicability
Asbestos in Soil	The HSL-A criteria were adopted for the assessment of asbestos in soil. The SAC adopted for asbestos were derived from the NEPM 2013 and are based on the Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009)[13] (endorsed in NEPM 2013). The SAC include the following: • No visible asbestos at the surface/in the top 10cm of soil; • <0.01% w/w bonded asbestos containing material (ACM) in soil; and • <0.001% w/w asbestos fines/fibrous asbestos (AF/FA) in soil. Despite the above, given the preliminary nature of the investigation, decisions relating to the requirement for further investigation have been based around asbestos either being detected or not detected (i.e. if asbestos is found during the PSI, this will trigger a requirement for detailed investigation/characterisation). Concentrations for bonded ACM concentrations in soil are based on the following equation which is presented in Schedule B1 of NEPM (2013): $$\textbf{\% w/w asbestos in soil} = \frac{\textbf{\% asbestos content x bonded ACM (kg)}}{\text{Soil volume (L) x soil density (kg/L)}}$$

[12] Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC Care), (2011). Technical Report No. 10 - *Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document*

[13] Western Australian (WA) Department of Health (DoH), (2009). Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia. (referred to as WA DoH 2009)

Guideline	Applicability
	However, we are of the opinion that the actual soil volume in a 10L bucket varies considerably due to the presence of voids, particularly when assessing cohesive soils. Therefore, each bucket sample was weighed using electronic scales and the above equation was adjusted as follows (we note that the units have also converted to grams): **% w/w asbestos in soil =** $\frac{\textbf{\% asbestos content x bonded ACM (g)}}{\text{Soil weight (g)}}$

7.1.2 Environment (Ecological – terrestrial ecosystems)

- Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) for an 'commercial/industrial' exposure scenario. The criterion for benzo(a)pyrene has been increased from the value presented in NEPM (2013) based on the Canadian Soil Quality Guidelines[14];
- ESLs were adopted based on the soil type;
- EILs for selected metals were calculated based on the most conservative added contaminant limit (ACL) values presented in Schedule B(1) of NEPM (2013) and published ambient background concentration (ABC) values presented in the document titled Trace Element Concentrations in Soils from Rural and Urban Areas of Australia (1995)[15]. This method is considered to be adequate for the Tier 1 screening.

7.1.3 Management Limits for Petroleum Hydrocarbons

Management limits for petroleum hydrocarbons (as presented in Schedule B1 of NEPM 2013) were considered.

7.1.4 Waste Classification

Data for the waste classification assessment were assessed in accordance with the Waste Classification Guidelines, Part 1: Classifying Waste (2014)[16] as outlined in the following table:

Table 7-2: Waste Categories

Category	Description
General Solid Waste (non-putrescible)	• If Specific Contaminant Concentration (SCC) ≤ Contaminant Threshold (CT1) then Toxicity Characteristics Leaching Procedure (TCLP) not needed to classify the soil as general solid waste; and • If TCLP ≤ TCLP1 and SCC ≤ SCC1 then treat as general solid waste.
Restricted Solid Waste (non-putrescible)	• If SCC ≤ CT2 then TCLP not needed to classify the soil as restricted solid waste; and • If TCLP ≤ TCLP2 and SCC ≤ SCC2 then treat as restricted solid waste.
Hazardous Waste	• If SCC > CT2 then TCLP not needed to classify the soil as hazardous waste; and • If TCLP > TCLP2 and/or SCC > SCC2 then treat as hazardous waste.

[14] Canadian Council of Ministers of the Environment, (1999). *Canadian soil quality guidelines for the protection of environmental and human health: Benzo(a)Pyrene (1997)* (referred to as the Canadian Soil Quality Guidelines)

[15] Olszowy, H., Torr, P., and Imray, P., (1995), *Trace Element Concentrations in Soils from Rural and Urban Areas of Australia. Contaminated Sites Monograph Series No. 4*. Department of Human Services and Health, Environment Protection Agency, and South Australian Health Commission

[16] NSW EPA, (2014). *Waste Classification Guidelines, Part 1: Classifying Waste.* (referred to as Waste Classification Guidelines 2014)

Category	Description
Virgin Excavated Natural Material (VENM)	Natural material (such as clay, gravel, sand, soil or rock fines) that meet the following: • That has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial mining or agricultural activities; • That does not contain sulfidic ores or other waste; and • Includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved from time to time by a notice published in the NSW Government Gazette.

8 RESULTS

8.1 Summary of Data (QA/QC) Evaluation

The data evaluation is presented in the appendices. In summary, JKE are of the opinion that the data are adequately precise, accurate, representative, comparable and complete to serve as a basis for interpretation to achieve the investigation objectives.

8.2 Subsurface Conditions

A summary of the subsurface conditions encountered during the investigation is presented in the following table. Reference should be made to the borehole logs attached in the appendices for further details.

Table 8-1: Summary of Subsurface Conditions

Profile	Description
Fill	Fill was encountered at the surface in all boreholes and extended to depths of approximately 0.2 to 0.5m BGL. The fill typically comprised silty clay with inclusions of igneous gravel, ironstone gravels and root fibres. One fibre cement fragment (FCF) was encountered in fill within BH2 (0-0.5). This was sampled for laboratory analysis as BH2-F1 (0-0.05m).
Natural Soil	Natural silty clay soil was encountered beneath the fill in all boreholes and extended to depths of between approximately 1.5mBGL to 6.9mBGL.
Bedrock	Siltstone bedrock was encountered in boreholes BH1, BH2 BH3 and BH4 at depths of between 5.7mBGL and 6.9mBGL.
Groundwater	The boreholes were largely dry on completion of augering. The water levels recorded on the logs were influenced by the introduction of water during the coring process.

8.3 Field Screening

A summary of the field screening results is presented in the following table:

Table 8-2: Summary of Field Screening

Aspect	Details
PID Screening of Soil Samples for VOCs	PID soil sample headspace readings are presented in attached report tables and the COC documents attached in the appendices. The results ranged from 0.1ppm to 33.5ppm equivalent isobutylene. These results indicate of the presence of PID detectable VOCs in some samples. The highest PID reading of 33.5ppm was encountered in a natural silty clay sample from BH2 (0.7-0.95m). This sample was not analysed for TRH/BTEX as this was outside the scope of the PSI. However, it is noted that the BH2 (0.7-0.95m) sample did not exhibit any indicators of hydrocarbon impact such as staining or odours.
Bulk Screening for Asbestos	The bulk field screening results are summarised in the attached report tables (Table S5). The concentration of asbestos from ACM in the bulk field sample BH2 (0-0.5m) was 0.016%w/w, which was below the SAC of 0.02%w/w for ACM >7mm.

8.4 Soil Laboratory Results

The soil laboratory results were assessed against the SAC presented in Section 7.1. Individual SAC are shown in the report tables attached in the appendices. A summary of the results is presented below:

8.4.1 Human Health and Environmental (Ecological) Assessment

Table 8-3: Summary of Soil Laboratory Results – Human Health and Environmental (Ecological)

Analyte	N	Max. (mg/kg)	N> Human Health SAC	N> Ecological SAC	Comments
Arsenic	5	17	0	NSL	-
Cadmium	5	LPQL	0	NSL	-
Chromium (total)	5	18	0	0	-
Copper	5	50	0	0	-
Lead	5	160	0	0	-
Mercury	5	0.5	0	NSL	-
Nickel	5	20	0	0	-
Zinc	5	180	0	0	-
Total PAHs	5	<PQL	0	NSL	-
Benzo(a)pyrene	5	<PQL	NSL	0	-
Carcinogenic PAHs (as BaP TEQ)	5	<PQL	0	NSL	-
Naphthalene	5	<PQL	0	NSL	-
DDT+DDE+DDD	3	<PQL	0	NSL	-
DDT	3	<PQL	NSL	0	-
Aldrin and dieldrin	3	<PQL	0	NSL	-
Chlordane	3	<PQL	0	NSL	-
Heptachlor	3	<PQL	0	NSL	-
PCBs	3	<PQL	0	NSL	-
TRH F1	5	<PQL	0	0	-
TRH F2	5	<PQL	0	-	-
TRH F3	5	<PQL	0	-	-

Analyte	N	Max. (mg/kg)	N> Human Health SAC	N> Ecological SAC	Comments
TRH F4	5	<PQL	0	-	-
Benzene	5	<PQL	0	-	-
Toluene	5	<PQL	0	-	-
Ethylbenzene	5	<PQL	0	-	-
Xylenes	5	<PQL	0	-	-
Asbestos (in soil) – 500ml Asbestos Containing Material (ACM) >7mm Asbestos Fines/Fibrous Asbestos (AF/FA)	1	 ACM <7mm <0.01%w/w AF/FA <0.001%w/w	 0 0	NA	This analysis was targeted on the soil profile where FCF/ACM was identified during the field screening.
Asbestos (detection) in soil	7	Detected	1	NA	Asbestos was detected in the soil sample from BH7 (0.1-0.2m)
Asbestos in fibre cement	1	-	1	NSL	BH2-F1 was assumed to be in the top 100mm of soil and was found to contain Chrysotile asbestos fibres.

Notes:

PQL: Practical Quantification Limit

N: Total number (primary samples)

NSL: No set limit

NL: Not limiting

8.4.2 Management Limits

All results were below the management limits.

8.4.3 Waste Classification Assessment

The laboratory results were assessed against the criteria presented in Section 7.1.4. The results are presented in the report tables attached in the appendices. A summary of the results is presented in the following table:

Table 8-4: Summary of Soil Laboratory Results Compared to CT and SCC Criteria

Analyte	N	N > CT Criteria	N > SCC Criteria	Comments
Arsenic	5	0	0	-
Cadmium	5	0	0	-
Chromium	5	0	0	-
Copper	5	NSL	NSL	-
Lead	5	2	0	Lead concentrations exceeded the CT1 criterion in three fill samples collected from BH2 (0-0.1m) (lab duplicate), BH4 (0.1-0.2m) and SDUP1 (BH8 0-0.2m). The maximum lead concentration was 160mg/kg.
Mercury	5	0	0	-
Nickel	5	0	0	-
Zinc	5	NSL	NSL	-
TRH (C_6-C_9)	5	0	0	-
TRH (C_{10}-C_{36})	5	0	0	-
BTEX	5	0	0	-
Total PAHs	5	0	0	-
Benzo(a)pyrene	5	0	0	-
OCPs & OPPs	3	0	0	-
PCBs	3	0	0	-
Asbestos	8	-	-	Asbestos was detected in the fill sample BH7 (0.1-0.2m). Chrysotile asbestos was detected in one FCF sample (BH2-F1) encountered in the fill in BH2 (0-0.5m).

N: Total number (primary soil samples)

NSL: No set limit

Table 8-5: Summary of Soil Laboratory Results Compared to TCLP Criteria

Analyte	N	N > TCLP Criteria	Comments
Lead	3	0	The three fill samples with lead concentrations above the CT1 criterion were analysed for TCLP lead. All results were below the TCLP1 criterion for lead.

N: Total number (primary soil samples)

9 WASTE CLASSIFICATION ASSESSMENT

9.1 Waste Classification of Fill

Based on the results of the waste classification assessment, and at the time of reporting, the fill material is assigned a preliminary classification of **General Solid Waste (non-putrescible) containing Special Waste (asbestos)**. Further waste classification assessment will be required to confirm the classification of the waste. The anticipated waste quantities should also be confirmed at that time and documented in the final waste classification report.

9.2 Classification of Natural Soil and Bedrock

Based on the scope of work undertaken for this investigation, and at the time of reporting, JKE are of the opinion that the natural soil and bedrock at the site is likely to meet the definition of **VENM** for off-site disposal or re-use purposes. The VENM classification should be confirmed prior to off-site disposal or re-use of the waste. Confirmation of the VENM classification will need to occur following removal of the overlying fill (an asbestos clearance certificate should also form part of this verification process). The anticipated waste quantities should also be confirmed at that time and documented in the final waste classification report.

In accordance with Part 1 of the Waste Classification Guidelines, VENM is pre-classified as general solid waste and can also be disposed of accordingly to a facility that is licensed to accept it.

10 DISCUSSION

10.1 Contamination Sources/AEC and Potential for Site Contamination

Based on the scope of work undertaken for this investigation, JKE identified the following potential contamination sources/AEC:

- Fill material;
- Agricultural land use; and
- Hazardous building materials.

Considering the above, and based on a qualitative assessment of various lines of evidence as discussed throughout this report, JKE are of the opinion that there is a potential for site contamination. The preliminary soil data collected for the investigation is discussed further in the following subsection, as part of the Tier 1 risk assessment.

10.2 Tier 1 Risk Assessment and Review of CSM

For a contaminant to represent a risk to a receptor, the following three conditions must be present:

1. Source – The presence of a contaminant;
2. Pathway – A mechanism or action by which a receptor can become exposed to the contaminant; and
3. Receptor – The human or ecological entity which may be adversely impacted following exposure to contamination.

If one of the above components is missing, the potential for adverse risks is relatively low.

10.2.1 Soil

Bonded ACM in the form of one FCF was encountered in the bulk fill sample obtained from BH2 (0-0.5m). Asbestos was also detected in the fill sample from BH7 (0.1-0.2m) in what the laboratory reported as “matted material”. The asbestos/ACM is considered most likely to be associated with historical demolition of structures at the site, and based on the current data it is our opinion that the matted asbestos material in BH7 is likely to be associated with degraded fibre cement.

There is potentially a complete SPR linkage to asbestos in soil in this area given the site is unpaved. However, we note that visible ACM was not observed at the ground surface and the grass cover was reasonably good across the site. On this basis, the potential for airborne asbestos fibres to be generated and for exposure to airborne asbestos to occur under the current site conditions is considered to be relatively low.

JKE note that although ACM was not identified in other areas of the site, there is considered to be a high potential for ACM to be present (and widespread) due to the historical demolition of residential buildings in multiple locations.

All other CoPC were reported at low concentrations (all below the SAC) or at levels below the laboratory detection limits. On this basis, and considering the site history, the primary CoPC to be considered in further detail include asbestos/ACM and lead (both of which are of most concern considering the historical demolition activities).

10.2.2 Groundwater

Based on the potential sources of contamination identified and the soil analysis results, the contaminants identified in soil are not considered to pose a risk to groundwater. There is considered to be a low potential for groundwater contamination at the site and therefore a low potential for groundwater to pose a risk to the receptors.

10.3 Decision Statements

The decision statements are addressed below:

Did the site inspection, or does the historical information identify potential contamination sources/AEC at the site?

Yes. The site history assessment identified that the site was historically used as grazing or agricultural purposes. This land use as well as hazardous building materials associated with historical demolition, and the presence of fill material at the site were identified as potential sources of contamination.

Are any results above the SAC?

Yes, bonded ACM was encountered in the fill in BH2. It has been assumed that the ACM in BH2 may have been in the top 100mm of soil. Asbestos was also detected in the fill/soil sample from BH7 (0.1-0.2m).

Do potential risks associated with contamination exist, and if so, what are they?

Potential human-health risks associated with the disturbance of soil containing asbestos exist. However, under the current site configuration whereby the site is predominantly grassed, the occurrence of asbestos/ACM is not likely to pose a significant risk provided the grass cover is maintained and soil disturbance does not occur.

Is further investigation and/or remediation required?

It is considered that remediation may be required due to the surficial nature of the identified ACM in BH2 and the degraded asbestos material in BH7. However, the requirement for remediation will need to be confirmed via further sampling of soil to provide a more detailed characterisation of the site conditions. A Detailed Site Investigation (DSI) is therefore be required. Depending on the outcome of the DSI, a Remediation Action Plan (RAP) and/or Asbestos Management Plan (AMP) will need to be implemented.

Is the site characterisation sufficient to provide adequate confidence in the above decisions?

Yes.

Is the site suitable for the proposed development, or can the site be made suitable subject to further characterisation and/or remediation?

We are of the opinion that the site can be made suitable for the proposed development. If remediation for asbestos is required, remediation strategies may include excavation and off-site disposal of contaminated soils and/or capping and containment of material on site. The contamination identified to date is well suited to a capping/containment approach and would pose a negligible risk to future site users if the approach is implemented adequately. These options would be further evaluated following the DSI.

10.4 Data Gaps

Soil sampling was limited to approximately 60% of the minimum sampling density recommended in the NSW EPA Sampling Design Guidelines 1995. Additionally, detailed asbestos quantification was not undertaken due to the preliminary nature of the investigation. Recommendations for additional soil sampling are included in the report to address this data gap. Where the occurrence of asbestos in soil is “known”, the WA DoH 2009 guidelines requires sampling at twice the sampling density specified in the NSW EPA Sampling Design Guidelines 1995 (i.e. 26 locations at this site).

11 CONCLUSIONS AND RECOMMENDATIONS

The investigation included a review of historical information and sampling from eight borehole locations. The site has historically been used for agricultural and residential purposes. Campbelltown City Council acquired the site between 1980 and 1991 and it has since been used as a public recreation space.

The investigation identified bonded ACM within the fill from BH2 in the eastern area of the site. Asbestos was also identified in fill/soil from BH7 (0.1-0.2m) in the western area of the site. Based on the Tier 1 risk assessment, the contamination identified at the site may pose a risk to human-health if the contamination is not managed properly during the construction phase of the proposed development. The asbestos-related risks in the context of the current land use were assessed to be low due to the most likely form of the asbestos being ACM (i.e. non-friable) and there being consistent grass coverage across the majority of the site.

JKE are of the opinion that the site can be made suitable for the proposed development described in Section 1.1. A DSI is required to address the data gaps outlined in Section 10.4 and to facilitate the preparation of a RAP and/or AMP. The DSI is to include the following:

- Additional soil sampling from 26 locations for asbestos quantification of asbestos/ACM in fill (this should include grid-based sampling across the site using an excavator). Identified ACM is to be submitted to a laboratory for confirmatory analysis, along with gravimetric analysis of selected soil samples; and
- Additional soil sampling and analysis of the fill and natural soil from at least eight of these locations to confirm the waste classification and provide additional characterisation for the identified CoPC.

If remediation for asbestos is required, remediation strategies may include excavation and off-site disposal of contaminated soils and/or capping and containment of material on site. The contamination identified to date is well suited to a capping/containment approach and would pose a negligible risk to future site users if the approach is implemented adequately. These options would be further evaluated following the DSI.

JKE are of the opinion that there is currently no requirement to report the contamination to the NSW EPA under the NSW EPA Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015)[17]. This is to be further evaluated as part of the DSI.

JKE consider that the report objectives outlined in Section 1.2 have been addressed.

[17] NSW EPA, (2015). *Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997* (referred to as Duty to Report Contamination)

12 LIMITATIONS

The report limitations are outlined below:

- JKE accepts no responsibility for any unidentified contamination issues at the site. Any unexpected problems/subsurface features that may be encountered during development works should be inspected by an environmental consultant as soon as possible;
- Previous use of this site may have involved excavation for the foundations of buildings, services, and similar facilities. In addition, unrecorded excavation and burial of material may have occurred on the site. Backfilling of excavations could have been undertaken with potentially contaminated material that may be discovered in discrete, isolated locations across the site during construction work;
- This report has been prepared based on site conditions which existed at the time of the investigation; scope of work and limitation outlined in the JKE proposal; and terms of contract between JKE and the client (as applicable);
- The conclusions presented in this report are based on investigation of conditions at specific locations, chosen to be as representative as possible under the given circumstances, visual observations of the site and immediate surrounds and documents reviewed as described in the report;
- Subsurface soil and rock conditions encountered between investigation locations may be found to be different from those expected. Groundwater conditions may also vary, especially after climatic changes;
- The investigation and preparation of this report have been undertaken in accordance with accepted practice for environmental consultants, with reference to applicable environmental regulatory authority and industry standards, guidelines and the assessment criteria outlined in the report;
- Where information has been provided by third parties, JKE has not undertaken any verification process, except where specifically stated in the report;
- JKE has not undertaken any assessment of off-site areas that may be potential contamination sources or may have been impacted by site contamination, except where specifically stated in the report;
- JKE accept no responsibility for potentially asbestos containing materials that may exist at the site. These materials may be associated with demolition of pre-1990 constructed buildings or fill material at the site;
- JKE have not and will not make any determination regarding finances associated with the site;
- Additional investigation work may be required in the event of changes to the proposed development or landuse. JKE should be contacted immediately in such circumstances;
- Material considered to be suitable from a geotechnical point of view may be unsatisfactory from a soil contamination viewpoint, and vice versa; and
- This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose.

Important Information About This Report

These notes have been prepared by JKE to assist with the assessment and interpretation of this report.

The Report is based on a Unique Set of Project Specific Factors
This report has been prepared in response to specific project requirements as stated in the JKE proposal document which may have been limited by instructions from the client. This report should be reviewed, and if necessary, revised if any of the following occur:

- The proposed land use is altered;
- The defined subject site is increased or sub-divided;
- The proposed development details including size, configuration, location, orientation of the structures or landscaped areas are modified;
- The proposed development levels are altered, eg addition of basement levels; or
- Ownership of the site changes.

JKE will not accept any responsibility whatsoever for situations where one or more of the above factors have changed since completion of the investigation. If the subject site is sold, ownership of the investigation report should be transferred by JKE to the new site owners who will be informed of the conditions and limitations under which the investigation was undertaken. No person should apply an investigation for any purpose other than that originally intended without first conferring with the consultant.

Changes in Subsurface Conditions
Subsurface conditions are influenced by natural geological and hydrogeological process and human activities. Groundwater conditions are likely to vary over time with changes in climatic conditions and human activities within the catchment (e.g. water extraction for irrigation or industrial uses, subsurface waste water disposal, construction related dewatering). Soil and groundwater contaminant concentrations may also vary over time through contaminant migration, natural attenuation of organic contaminants, ongoing contaminating activities and placement or removal of fill material. The conclusions of an investigation report may have been affected by the above factors if a significant period of time has elapsed prior to commencement of the proposed development.

This Report is based on Professional Interpretations of Factual Data
Site investigations identify actual subsurface conditions at the actual sampling locations at the time of the investigation. Data obtained from the sampling and subsequent laboratory analyses, available site history information and published regional information is interpreted by geologists, engineers or environmental scientists and opinions are drawn about the overall subsurface conditions, the nature and extent of contamination, the likely impact on the proposed development and appropriate remediation measures.

Actual conditions may differ from those inferred, because no professional, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an investigation indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, but steps can be taken to help minimise the impact. For this reason, site owners should retain the services of their consultants throughout the development stage of the project, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

Investigation Limitations
Although information provided by a site investigation can reduce exposure to the risk of the presence of contamination, no environmental site investigation can eliminate the risk. Even a rigorous professional investigation may not detect all contamination on a site. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas which showed no signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant which may occur; only the most likely contaminants are screened.

Misinterpretation of Site Investigations by Design Professionals

Costly problems can occur when other design professionals develop plans based on misinterpretation of an investigation report. To minimise problems associated with misinterpretations, the environmental consultant should be retained to work with appropriate professionals to explain relevant findings and to review the adequacy of plans and specifications relevant to contamination issues.

Logs Should not be Separated from the Investigation Report

Borehole and test pit logs are prepared by environmental scientists, engineers or geologists based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these should not be re-drawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however contractors can still misinterpret the logs during bid preparation if separated from the text of the investigation. If this occurs, delays, disputes and unanticipated costs may result. In all cases it is necessary to refer to the rest of the report to obtain a proper understanding of the investigation. Please note that logs with the 'Environmental Log' header are not suitable for geotechnical purposes as they have not been peer reviewed by a Senior Geotechnical Engineer.

To reduce the likelihood of borehole and test pit log misinterpretation, the complete investigation should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of subsurface information does not insulate an owner from the attendant liability. It is critical that the site owner provides all available site information to persons and organisations such as contractors.

Read Responsibility Clauses Closely

Because an environmental site investigation is based extensively on judgement and opinion, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, model clauses have been developed for use in written transmittals. These are definitive clauses designed to indicate consultant responsibility. Their use helps all parties involved recognise individual responsibilities and formulate appropriate action. Some of these definitive clauses are likely to appear in the environmental site investigation, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to any questions.

Appendix A: Report Figures

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

This plan should be read in conjunction with the Environmental report.

Title: **SITE LOCATION PLAN**

Location: CNR OF KELLICAR AND CAMDEN ROAD, CAMPBELLTOWN, NSW

Project No: E33438PL

Figure No: 1

JKEnvironments

PLOT DATE: 10/09/2020 1:51:27 PM DWG FILE: Z:\5 EIS\5C- EIS JOBS\33000\SIE33438PL CAMPBELLTOWN\CAD\E33438PL.DWG

LEGEND

APPROXIMATE SITE BOUNDARY

BH(Fill Depth) BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 5 10 15 20 25

SCALE 1:500 @A3 METRES

This plan should be read in conjunction with the Environmental report.

Title: **SAMPLE LOCATION PLAN**

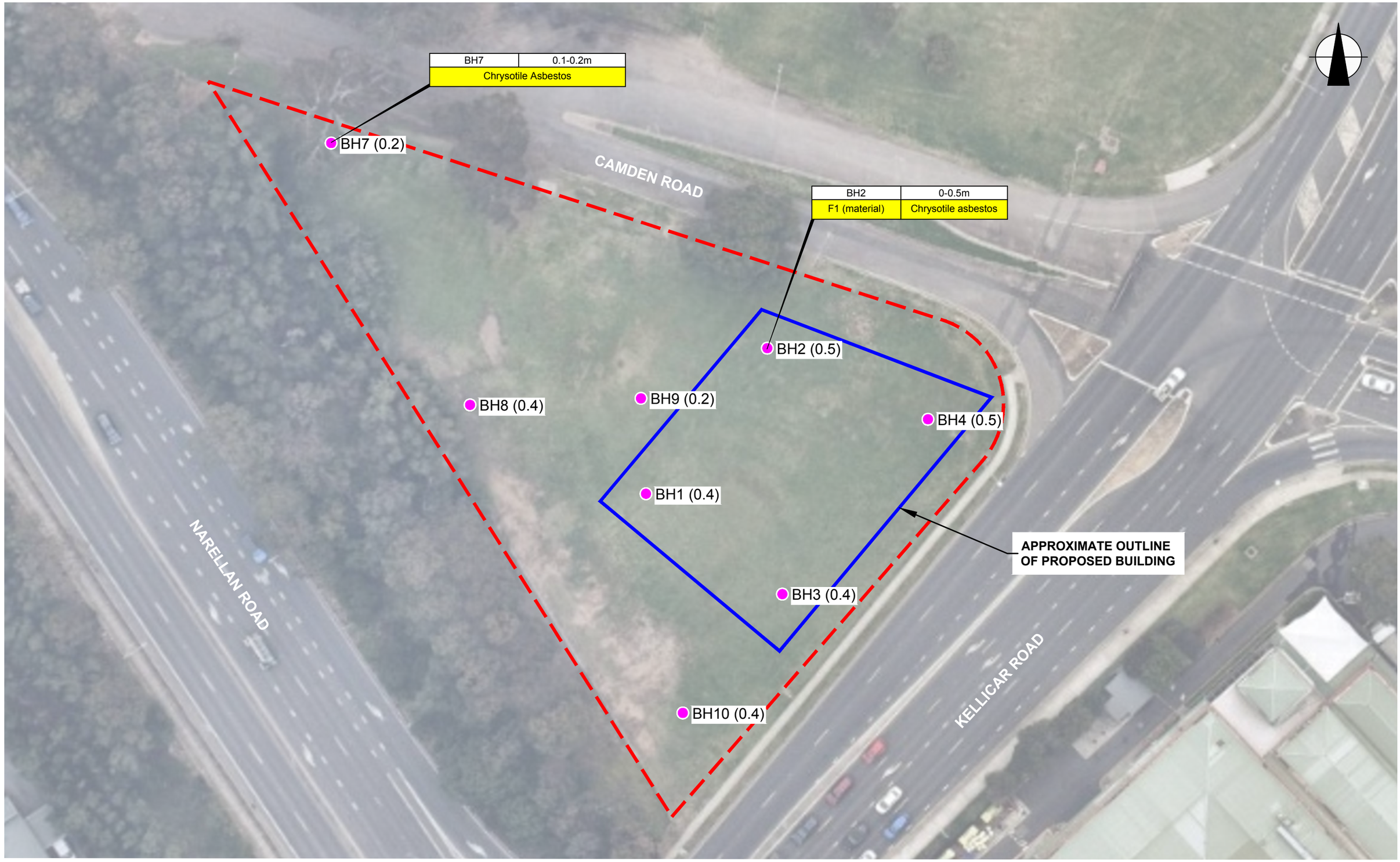
Location: CNR OF KELLICAR AND CAMDEN ROAD, CAMPBELLTOWN, NSW

Project No: E33438PL

Figure No: 2

JKEnvironments

PLOT DATE: 11/09/2020 11:30:39 AM DWG FILE: Z:\S EIS\SC EIS JOBS\33000'S\E33438PL CAMPBELLTOWN\CAD\E33438PL.DWG



LEGEND

- APPROXIMATE SITE BOUNDARY
- BH(Fill Depth) — BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)

SAMPLE ID	DEPTH (metres)
CHEMICAL	CONCENTRATION

SOIL/SURFACE SAMPLE EXCEEDANCE

SOIL/SURFACE CONTAMINATION ABOVE SAC FOR HUMAN HEALTH RISK

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 5 10 15 20 25

SCALE 1:500 @A3 METRES

This plan should be read in conjunction with the Environmental report.

Title: **CONTAMINATION LOCATION PLAN**

Location: CNR OF KELLICAR AND CAMDEN ROAD, CAMPBELLTOWN, NSW

Project No: E33438PL

Figure No: 3

JKEnvironments

PLOT DATE: 1/10/2020 8:45:35 AM DWG FILE: Z:\5 EIS\5C EIS JOBS\33000'S\E33438PL CAMPBELLTOWN\CAD\E33438PL.DWG

Appendix B: Site Information and Site History

Land Title Records

ADVANCE LEGAL SEARCHERS PTY LTD

(ACN 147 943 842)
ABN 82 147 943 842

18/36 Osborne Road,
Manly NSW 2095

Telephone: +612 9977 6713
Mobile: 0412 169 809
Email: search@alsearchers.com.au

19th August, 2020

JKENVIRONMENTS PTY LIMITED
PO BOX 976,
NORTH RYDE BC NSW 1670

Attention: Harry Leonard,

RE: **Crn Kellicar & Camden Roads,**
Campbelltown
Job No. E33438PL

Current Search

Folio Identifier 1/883417 (title attached)
DP 883417 (plan attached)
Dated 19th August, 2020
Registered Proprietor:
CAMPBELLTOWN CITY COUNCIL

Title Tree
Lot 1 DP 883417

Folio Identifier 1/883417

See Notes (a), (b), (c), (d), (e) & (f)

(a)

Folio Identifier X/404798

CTVol 7545 Folio 82

Certificate of Title Volume 6656 Folio 59

PA 37163

Conveyance Book 1323 No 438

****

(b)

Folio Identifier Y/404798

CTVol 14233 Folio 5

(c)

Folio Identifier 1/770632

CA 26792

Conveyance Book 3724 No 123

Acknowledgement Book 2903 No 51

Conveyance Book 2421 No 533

Conveyance Book 1702 No 882

Conveyance Book 1375 No 642

****

(d)

CA 75539

Conveyance Book 3404 No 296

Conveyance Book 2199 No 159

Conveyance Book 1702 No 882

Conveyance Book 1375 No 642

****

(e)

Folio Identifier 6/807793

Folio Identifier 2001/740386

Folio Identifier 591/739663

CTVol 15408 Folio 116

PA59150

CTVol 8302 Folio 147

CTVol 7059 Folio 216

CTVol 3167 Folio 160

****

(f)

Folio Identifier 7/807793

Folio Identifier 102/735031

CTVol 2179 Folio 109

****

Summary of proprietor(s)
Lot 1 DP 883417

Year	Proprietor(s)
	(Lot 1 DP 883417)
1999 – todate	Campbelltown City Council

See Notes (a), (b), (c), (d), (e) & (f)

Note (a)

	(Lot X DP 404798)
1988 – 1999	Campbelltown City Council
	(Lot X DP 404798 – Area 34 ½ Perches – CTVol 7545 Fol 82)
1985 – 1988	Campbelltown City Council
1958 – 1985	Audrey Winifred Larnach, married woman Bruce Edward Larnach, engine driver
	(Lot 16 Stanley's Estate – Area 2 Roods 6 Perches – CTVol 6656 Fol 59)
1953 – 1958	Lilian Mabel Sproule, wife of Charles Sproule, dairy farmer
1953 – 1953	Doris Elsie Dubber, wife of Leonard Aubrey Dubber, fitter
	(Lot 16 Stanley's Estate – Area 2 Roods 6 Perches – PA 37163)
1938 – 1953	Doris Elsie Dubber, Married woman /administrix *(formerly Doris Elsie Jones)* Claude Aubrey Jones, estate
1929 – 1938	Doris Elsie Jones, widow /administrix Claude Aubrey Jones, estate
	(Lot 16 Stanley's Estate – Area 2 Roods 6 Perches – Conv Bk 1323 No 438)
1920 – 1929	Claude Aubrey Jones, dairy farmer

****

Note (b)

	(Lot Y DP 404798)
1988 – 1999	Campbelltown City Council
	(Lot Y DP 404798 – Area 34 ½ Perches – CTVol 14233 Fol 5)
1986 – 1988	Campbelltown City Council
1980 – 1986	Marian Shuk-Yin Chaung, married woman
1980 – 1980	Audrey Winifred Larnach, married woman Lilian Alicia Sullivan, widow
	(Lot 16 Stanley's Estate – Area 2 Roods 6 Perches – CTVol 6656 Fol 59)
1953 – 1980	Lilian Mabel Sproule, wife of Charles Sproule, dairy farmer
1953 – 1953	Doris Elsie Dubber, wife of Leonard Aubrey Dubber, fitter
	(Lot 16 Stanley's Estate – Area 2 Roods 6 Perches – PA 37163)
1938 – 1953	Doris Elsie Dubber, Married woman /administrix *(formerly Doris Elsie Jones)* Claude Aubrey Jones, estate
1929 – 1938	Doris Elsie Jones, widow /administrix Claude Aubrey Jones, estate
	(Lot 16 Stanley's Estate – Area 2 Roods 6 Perches – Conv Bk 1323 No 438)
1920 – 1929	Claude Aubrey Jones, dairy farmer

****

Note (c)

	(Lot 1 DP 770632)
1988 – 1999	Campbelltown City Council
	(Lot A DP 153649 – Conv Bk 3724 No 123)
1987 – 1988	Campbelltown City Council
	(Part Lot 17 Stanley's Estate – Area 13 ¼ Perches – Acknow Bk 2903 No 51)
1968 – 1987	Noel Dunross Goudie
1968 – 1968	Winifred Lydia Bootes, executrix Walter Dunross Goudie, estate
	(Part Lot 17 Stanley's Estate – Area13 ¼ Perches – Conv Bk 2421 No 533)
1957 – 1968	Walter Dunross Goudie, retired civil engineer
	(Part Lot 17 Stanley's Estate – Conv Bk 1702 No 882)
1934 – 1957	James Lindsay Roy Ashford, railway gatehouse keeper
	(Part Lot 17 Stanley's Estate – Conv Bk 1375 No 642)
1925 – 1934	Grace Farrar Tindale, dairy farmer

****

Note (d)

	(Part Lot 17 Stanley's Estate – Area 16 ¼ Perches – Conv Bk 3404 No 296)
1980 – 1999	Campbelltown City Council
1977 – 1980	James Hay Forrest, builder / executor Helen Hay Foster, married woman / executrix Helen Anderson Forrest, estate
1972 – 1977	Helen Anderson Forrest, widow / executor James Broatch Forrest, estate
	(Part Lot 17 Stanley's Estate – Area 16 ¼ Perches – Conv Bk 2199 No 159)
1951 – 1987	James Broatch Forrest, tailor Helen Anderson Forrest, his wife
	(Lot 17 Stanley's Estate – Conv Bk 1702 No 882)
1934 – 1951	James Lindsay Roy Ashford, railway gatehouse keeper
	(Part Lot 17 Stanley's Estate – Conv Bk 1375 No 642)
1925 – 1934	Grace Farrar Tindale, dairy farmer

****

Note (e)

	(Lot 6 DP 807793)
1991 – 1999	Campbelltown City Council
1991 – 1991	Director MacArthur Growth Area
	(Lot 2001 DP 740386)
1987 – 1991	Director MacArthur Growth Area
	(Lot 591 DP 739663)
1987 – 1987	Director MacArthur Growth Area
	(Lot 264 DP 259877 – CTVol 15408 Fol 116)
1986 – 1987	Director MacArthur Growth Area
	(Part Portions 72 & 73 Parish St Peters – Area 57 Acres 3 Roods 2 ½ Perches – CTVol 8302 Fol 147)
1980 – 1986	New South Wales Planning and Environment Commission
1961 – 1980	The Council of the Municipality of Campbelltown
	(Part Portions 72 & 73 Parish St Peters – Area 57 Acres 3 Roods 21 ¼ Perches – CTVol 7059 Fol 216)
1955 – 1961	The Council of the Municipality of Campbelltown
	(Portion 73 Parish St Peters – Area 47 Acres 3 Roods 29 Perches – CTVol 3167 Fol 160)
1954 – 1955	The Council of the Municipality of Campbelltown
1933 – 1954	Cassandra Jane Flitcroft, widow
(1927 – 1955)	*(lease to Hannabal James Payten, grazier Edward John King, civil servant and John George Vardy, postal official)*
1921 – 1933	Peter Flitcroft, farmer

****

Note (f)

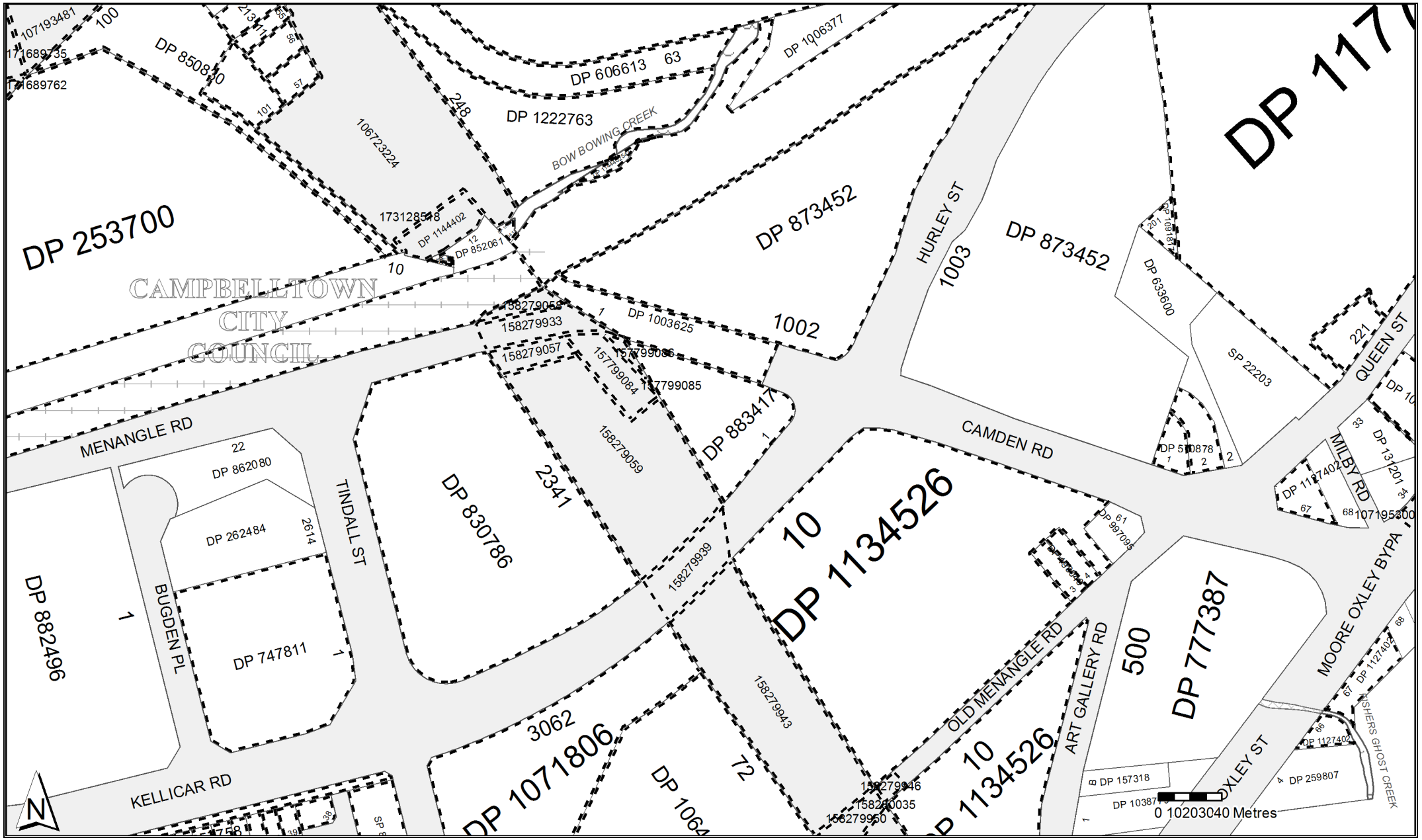
	(Lot 7 DP 807793)
1991 – 1999	Campbelltown City Council
1991 – 1991	Director MacArthur Growth Area
	(Lot 102 DP 735031)
1986 – 1991	Director MacArthur Growth Area
	(Part Portion 74 Parish St Peters – Area 3 Roods 7 ½ Perches – CTVol 2179 Fol 109)
1986 – 1986	Director MacArthur Growth Area
1976 – 1986	Campbelltown Catholic Club Limited
1948 – 1976	Roy Allen Winton, carpenter
1943 – 1948	Frederick William Werner Munro, textile worker
1943 – 1943	George Steven Nicol, carrier
1922 – 1943	George Nicol, retired farmer
1912 – 1922	Emma Stanley, married woman
1911 – 1912	Thomas Charles Stanley, licensed victualler
1911 – 1911	Charles George Godfrey Joseph Stanley, civil servant

****

Cadastral Records Enquiry Report : Lot 1 DP 883417

Ref : NOUSER

Locality : CAMPBELLTOWN
Parish : ST PETER
LGA : CAMPBELLTOWN
County : CUMBERLAND



Report Generated 5:09:35 PM, 18 August, 2020

This information is provided as a searching aid only.Whilst every endeavour is made to ensure that current map, plan and titling information is accurately reflected, the Registrar General cannot guarantee the information provided. For ALL ACTIVITY PRIOR TO SEPTEMBER 2002 you must refer to the RGs Charting and Reference Maps

	Status	Surv/Comp	Purpose
DP192157			
Lot(s): 32			
UNCONVERTIBLE OLD SYSTEM RESIDUE FEE APPEARS TO REMAIN IN CROWN GRANT SERIAL 8 PAGE 195 CERTIFICATE OF TITLE CREATION WILL REQUIRE A DEPOSITED PLAN OF SURVEY AND A PRIMARY APPLICATION BASED UPON ADVERSE POSSESSION			
DP193040			
Lot(s): 3, 4			
CA111907 - LOTS 3-4 DP193040			
DP253700			
Lot(s): 3			
DP1144402	REGISTERED	SURVEY	RESUMPTION OR ACQUISITION
NSW GAZ. 05-03-2010 Folio : 1158 ACQUIRED FOR THE PURPOSES OF THE RAIL CORPORATION NEW SOUTH WALES PROPOSED EASEMENT FOR CONSTRUCTION PURPOSES VARIABLE WIDTH SHOWN IN DP1144402. ERRATUM GAZ. 8-10-2010 FOL. 5115			
EX-SUR 34/25 DP983283			
DP570878			
Lot(s): 1			
DP267095	REGISTERED	COMPILATION	EASEMENT
Lot(s): 2			
CA111650 - LOT 2 DP570878			
DP606613			
Lot(s): 63			
DP1144402	REGISTERED	SURVEY	RESUMPTION OR ACQUISITION
NSW GAZ. 05-03-2010 Folio : 1158 ACQUIRED FOR THE PURPOSES OF THE RAIL CORPORATION NEW SOUTH WALES PROPOSED EASEMENT FOR CONSTRUCTION PURPOSES VARIABLE WIDTH SHOWN IN DP1144402. ERRATUM GAZ. 8-10-2010 FOL. 5115			
DP747811			
Lot(s): 1			
SP98728	PRE-ALLOCATED	UNAVAILABLE	STRATA PLAN
DP830786			
Lot(s): 2341			
DP1030082	REGISTERED	SURVEY	EASEMENT
DP1160706	REGISTERED	SURVEY	ROADS ACT, 1993
DP1166374	REGISTERED	SURVEY	ROADS ACT, 1993
DP850830			
Lot(s): 100			
DP1144402	REGISTERED	SURVEY	RESUMPTION OR ACQUISITION
NSW GAZ. 05-03-2010 Folio : 1161 ACQUIRED FOR THE PURPOSES OF THE RAIL CORPORATION NEW SOUTH WALES. PROPOSED EASEMENT FOR CONSTRUCTION PURPOSES VARIABLE WIDTH SHOWN IN DP1144402. ERRATUM GAZ. 8-10-2010 FOL. 5115			
Lot(s): 100, 101			
EX-SUR 34/25 DP983283			
DP873452			
Lot(s): 1002			
DP1061971	REGISTERED	SURVEY	EASEMENT
DP1160704	REGISTERED	SURVEY	ROADS ACT, 1993
DP1165442	REGISTERED	SURVEY	ROADS ACT, 1993
DP883417			
Lot(s): 1			
DP1160704	REGISTERED	SURVEY	ROADS ACT, 1993
DP1165442	REGISTERED	SURVEY	ROADS ACT, 1993
DP1003625			
Lot(s): 1			
DP1160704	REGISTERED	SURVEY	ROADS ACT, 1993
DP1165442	REGISTERED	SURVEY	ROADS ACT, 1993

	Status	Surv/Comp	Purpose
DP1022940			
Lot(s): 1			
DP437138	HISTORICAL	SURVEY	UNRESEARCHED
DP843239	HISTORICAL	SURVEY	SUBDIVISION
DP873452	HISTORICAL	SURVEY	SUBDIVISION
DP875829	HISTORICAL	SURVEY	SUBDIVISION
DP1006377	HISTORICAL	SURVEY	RESUMPTION OR ACQUISITION
DP1057758			
Lot(s): 38, 39, 40, 41, 42, 43, 44, 45			
DP818815	HISTORICAL	SURVEY	SUBDIVISION
DP1038888	HISTORICAL	SURVEY	SUBDIVISION
DP1064866			
Lot(s): 72			
DP818815	HISTORICAL	SURVEY	SUBDIVISION
DP1038888	HISTORICAL	SURVEY	SUBDIVISION
DP1057758	HISTORICAL	SURVEY	SUBDIVISION
DP1058047	HISTORICAL	SURVEY	SUBDIVISION
DP1110209	REGISTERED	SURVEY	EASEMENT
DP1068335			
Lot(s): 363			
DP584098	HISTORICAL	SURVEY	SUBDIVISION
DP711210	HISTORICAL	SURVEY	SUBDIVISION
DP818815	HISTORICAL	SURVEY	SUBDIVISION
DP1014456	HISTORICAL	COMPILATION	DEPARTMENTAL
DP1038888	HISTORICAL	SURVEY	SUBDIVISION
DP1057758	HISTORICAL	SURVEY	SUBDIVISION
DP1058047	HISTORICAL	SURVEY	SUBDIVISION
DP1071806			
Lot(s): 3063			
DP1140730	REGISTERED	SURVEY	EASEMENT
Lot(s): 3062, 3063			
DP584098	HISTORICAL	SURVEY	SUBDIVISION
DP711210	HISTORICAL	SURVEY	SUBDIVISION
DP818815	HISTORICAL	SURVEY	SUBDIVISION
DP1014456	HISTORICAL	COMPILATION	DEPARTMENTAL
DP1038888	HISTORICAL	SURVEY	SUBDIVISION
DP1057758	HISTORICAL	SURVEY	SUBDIVISION
DP1058047	HISTORICAL	SURVEY	SUBDIVISION
DP1068335	HISTORICAL	SURVEY	SUBDIVISION
DP1091817			
Lot(s): 201			
DP77929	HISTORICAL	SURVEY	UNRESEARCHED
DP1093140			
Lot(s): 1			
DP555879	HISTORICAL	SURVEY	OLD SYSTEM CONVERSION
CA97971 - PART LOT 1 DP1093140			
DP1127402			
Lot(s): 66, 67			
CA103621 - LOTS 66-68 DP1127402			

	Status	Surv/Comp	Purpose
DP1134526			
Lot(s): 10			
DP156043	HISTORICAL	COMPILATION	UNRESEARCHED
DP193040	HISTORICAL	COMPILATION	UNRESEARCHED
DP308932	HISTORICAL	SURVEY	UNRESEARCHED
DP410899	HISTORICAL	SURVEY	UNRESEARCHED
DP801988	HISTORICAL	SURVEY	SUBDIVISION
DP809566	HISTORICAL	SURVEY	OLD SYSTEM CONVERSION
DP818815	HISTORICAL	SURVEY	SUBDIVISION
DP1038888	HISTORICAL	SURVEY	SUBDIVISION
DP1158137	REGISTERED	SURVEY	EASEMENT
DP1144402			
Lot(s): 540			
DP852061	HISTORICAL	SURVEY	RESUMPTION OR ACQUISITION
Lot(s): 543			
NSW GAZ.	05-03-2010		Folio : 1158
ACQUIRED FOR THE PURPOSES OF THE RAIL CORPORATION NEW SOUTH WALES - LOT 110 DP1141484 AND EASEMENT FOR CONSTRUCTION PURPOSES VARIABLE WIDTH SHOWN IN DP1144402. ERRATUM GAZ. 8-10-2010 FOL. 5115			
Lot(s): 540, 541, 542, 543			
NSW GAZ.	05-03-2010		Folio : 1158
ACQUIRED FOR THE PURPOSES OF THE RAIL CORPORATION NEW SOUTH WALES - LOTS 540-543 DP1144402			
Lot(s): 541, 542			
PA83187 - LOTS 541-542 DP1144402			
DP1177784			
Lot(s): 220, 221			
DP77929	HISTORICAL	SURVEY	UNRESEARCHED
DP1052136	WITHDRAWN	SURVEY	SUBDIVISION
DP1066906	HISTORICAL	SURVEY	OLD SYSTEM CONVERSION
DP1091817	HISTORICAL	SURVEY	SUBDIVISION
PA81534 - LOT 1 DP1066906			
DP1186301			
Lot(s): 601			
CA167662 - LOT 601 DP1186301			
DP1190428			
Lot(s): 100, 101			
DP852061	HISTORICAL	SURVEY	RESUMPTION OR ACQUISITION
DP1144402	HISTORICAL	SURVEY	RESUMPTION OR ACQUISITION
Lot(s): 100			
NSW GAZ.	06-06-2014		Folio : 2345
ACQUIRED FOR THE PURPOSES OF THE RAIL CORPORATION NEW SOUTH WALES - LOT 100 DP1190428 - SEE AI660099			
DP1213111			
Lot(s): 54, 55, 56, 57			
DP852061	HISTORICAL	SURVEY	RESUMPTION OR ACQUISITION
Lot(s): 55, 56, 57			
CA119596 - LOTS 9-11 DP852061			
Lot(s): 54			
CA108091 - LOTS 6-8 DP852061			
DP1222763			
Lot(s): 248			
DP788268	HISTORICAL	SURVEY	SUBDIVISION
DP1198516	HISTORICAL	COMPILATION	RESUMPTION OR ACQUISITION
NSW GAZ.	05-03-2010		Folio : 1158
ACQUIRED FOR THE PURPOSES OF THE RAIL CORPORATION NEW SOUTH WALES PROPOSED EASEMENT FOR CONSTRUCTION PURPOSES VARIABLE WIDTH SHOWN IN DP1144402. ERRATUM GAZ. 8-10-2010 FOL. 5115			

	Status	Surv/Comp	Purpose
Road			
Polygon Id(s): 106723224, 107193481, 171689735, 171689762			
EX-SUR 34/25 DP983283			
Polygon Id(s): 157799084			
NSW GAZ. 25-05-2007 Folio : 3003 DECLARED MAIN ROAD AND CONTROLLED ACCESS ROAD LOT X DP392200			
Polygon Id(s): 158279059			
NSW GAZ. 25-05-2007 Folio : 3003 DEDICATED PUBLIC ROAD DECLARED MAIN ROAD AND CONTROLLED ACCESS ROAD LOT 5 DP807793			
Polygon Id(s): 158279057			
NSW GAZ. 25-05-2007 Folio : 3003 DEDICATED PUBLIC ROAD DECLARED MAIN ROAD AND CONTROLLED ACCESS ROAD LOT 2342 DP830786			
Polygon Id(s): 157799086, 157799085, 157799084			
NSW GAZ. 27-10-2006 Folio : 9170 DEDICATED PUBLIC ROAD LOTS 23-24 DP852061 AND LOT X DP392200			
Polygon Id(s): 158279058			
NSW GAZ. 25-05-2007 Folio : 3003 DEDICATED PUBLIC ROAD DECLARED MAIN ROAD AND CONTROLLED ACCESS ROAD LOT 22 DP852061			
Polygon Id(s): 158279950, 158279946, 158280035, 158279943			
NSW GAZ. 25-05-2007 Folio : 3003 DEDICATED PUBLIC ROAD DECLARED MAIN ROAD AND CONTROLLED ACCESS ROAD LOT 363 DP1068335			
Polygon Id(s): 173128518			
DP1190428	REGISTERED	COMPILATION	RESUMPTION OR ACQUISITION
SP82690			
DP818815	HISTORICAL	SURVEY	SUBDIVISION
DP1038888	HISTORICAL	SURVEY	SUBDIVISION
DP1057758	HISTORICAL	SURVEY	SUBDIVISION
DP1124064	HISTORICAL	COMPILATION	CONSOLIDATION
Road			
Polygon Id(s): 107195300			
NSW GAZ. 27-11-2009 Folio : 5849 DEDICATED PUBLIC ROAD LOTS 1-2 DP533207, LOT 1 DP1009097			
Polygon Id(s): 158279933			
NSW GAZ. 25-05-2007 Folio : 3003 DEDICATED PUBLIC ROAD DECLARED MAIN ROAD AND CONTROLLED ACCESS ROAD LOT 2342 DP830786			
Polygon Id(s): 158279933, 158279939, 157799086, 157799084			
NSW GAZ. 25-05-2007 Folio : 3003 DECLARED MAIN ROAD AND CONTROLLED ACCESS ROAD LOTS 23, 24, 27 AND 28 DP852061			

Plan	Surv/Comp	Purpose
DP89364	SURVEY	UNRESEARCHED
DP131201	COMPILATION	DEPARTMENTAL
DP137067	COMPILATION	DEPARTMENTAL
DP157318	SURVEY	UNRESEARCHED
DP192157	COMPILATION	UNRESEARCHED
DP193040	COMPILATION	UNRESEARCHED
DP213026	SURVEY	SUBDIVISION
DP230227	SURVEY	SUBDIVISION
DP253700	SURVEY	OLD SYSTEM CONVERSION
DP259807	SURVEY	ROAD OR MOTORWAY
DP262484	SURVEY	SUBDIVISION
DP570878	SURVEY	ROAD OR MOTORWAY
DP606613	SURVEY	RESUMPTION OR ACQUISITION
DP633600	SURVEY	OLD SYSTEM CONVERSION
DP702933	SURVEY	OLD SYSTEM CONVERSION
DP747811	COMPILATION	CONSOLIDATION
DP777387	SURVEY	OLD SYSTEM CONVERSION
DP830786	SURVEY	SUBDIVISION
DP850830	SURVEY	SUBDIVISION
DP852061	SURVEY	RESUMPTION OR ACQUISITION
DP862080	SURVEY	SUBDIVISION
DP873452	SURVEY	SUBDIVISION
DP882496	SURVEY	SUBDIVISION
DP883417	SURVEY	CONSOLIDATION
DP997095	COMPILATION	DEPARTMENTAL
DP1003625	SURVEY	ROADS ACT, 1993
DP1006377	SURVEY	RESUMPTION OR ACQUISITION
DP1022940	SURVEY	CONSOLIDATION
DP1038779	COMPILATION	LIMITED FOLIO CREATION
DP1057758	SURVEY	SUBDIVISION
DP1064866	SURVEY	SUBDIVISION
DP1071806	SURVEY	SUBDIVISION
DP1091817	SURVEY	SUBDIVISION
DP1093140	SURVEY	SUBDIVISION
DP1127402	COMPILATION	LIMITED FOLIO CREATION
DP1134526	SURVEY	CONSOLIDATION
DP1144402	SURVEY	RESUMPTION OR ACQUISITION
DP1177784	SURVEY	SUBDIVISION
DP1186301	COMPILATION	LIMITED FOLIO CREATION
DP1190428	COMPILATION	RESUMPTION OR ACQUISITION
DP1213111	SURVEY	DELIMITATION
DP1222763	SURVEY	SUBDIVISION
DP1222763	UNRESEARCHED	SUBDIVISION
SP22203	COMPILATION	STRATA PLAN
SP82690	COMPILATION	STRATA PLAN

[redacted]IFICATE OF TITLE

NEW SOUTH WALES

[redacted]REAL PROPERTY ACT, 1900

14233005

Appln No 37163

Prior Title Vol. 6656 Fol. 59

Vol. [redacted] Fol. [redacted]

EDITION ISSUED

22 9 1980

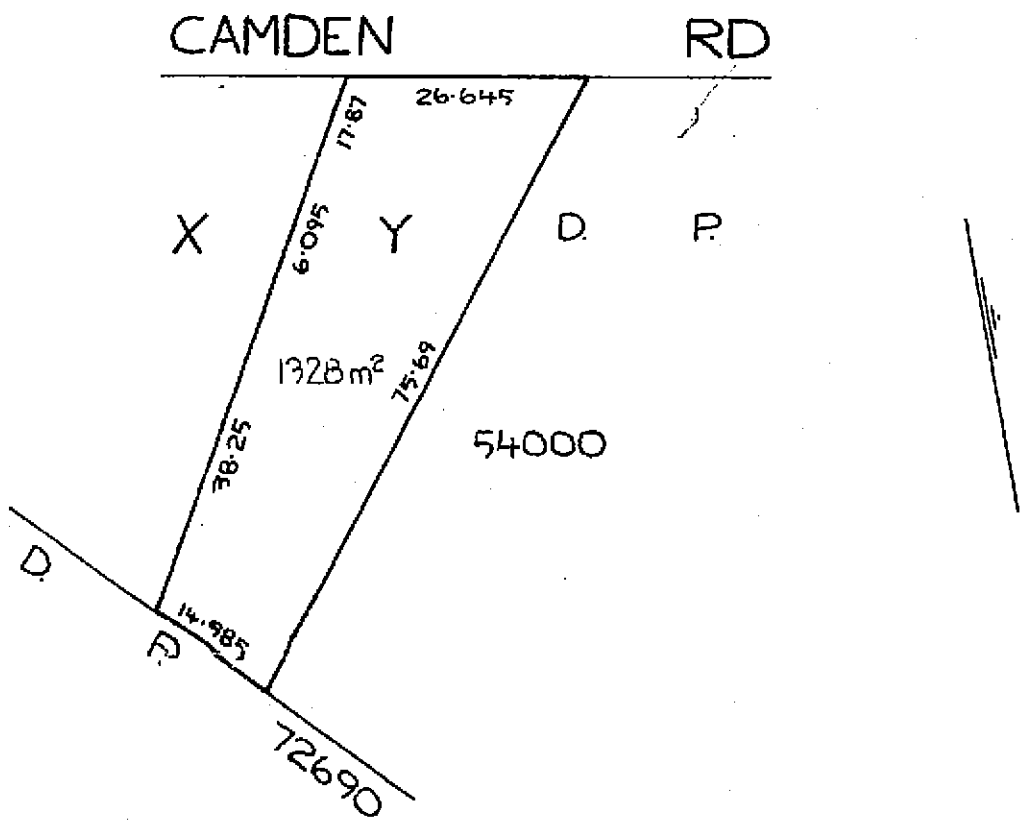
I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

Registrar General.

(Page 1) Vol. 14233 Fol. 5

PLAN SHOWING LOCATION OF LAND

LENGTHS ARE IN METRES



R.893585

REDUCTION RATIO 1:800

GR 4

ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lot Y in Deposited Plan 404798 in the City of Campbelltown Parish of St. Peter and County of Cumberland being part of Portion 74 granted to Joseph Phelphs on 8-10-1816.

FIRST SCHEDULE

~~AUDREY WINIFRED LARNACH Married Woman and LILIAN ALICIA SULLIVAN, Widow, both of Campbelltown, as Joint Tenants.~~

SECOND SCHEDULE

1. Reservations and conditions, if any, contained in the Crown grant above referred to.

Vol. 5 Fol. 14233

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	REGISTERED	Signature of Registrar General
~~Marian Lee Shuk-Yin Cheung of Campsie, Married Woman.~~ Campbelltown City Council by Transfer W448838. Registered 11-8-1986.	~~Transfer~~	~~S135546~~	~~5-11-1980~~	

CANCELLED

SEE AUTO FOLIO

S135546TE
-97M
S610918 D/A.1
W448838T

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	PARTICULARS	REGISTERED	Signature of Registrar General	CANCELLATION	
~~Mortgage~~	~~S135547~~	~~to Audrey Winifred Larnach, Married Woman and Lilian Alicia Sullivan, Clerk,~~				
		~~both of Campbelltown as tenants in common.~~	~~5-11-1980~~		Discharged	S610918

(Page 2 of 2 pages)

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

Ref:ALS /Src:T

[redacted]ICATE OF TITLE

NEW SOUTH WALES [redacted] PROPERTY ACT, 1900

15408 116

First Title Old System

Prior Title PA59150

Vol. 15408 Fol. 116

EDITION 7 ISSUED 1 1986

I certify that the person named in the First Schedule is the registered proprietor of an estate in fee simple (or such other estate or interest as is set out below) in the land described subject to the recordings appearing in the Second Schedule and to the provisions of the Real Property Act, 1900.

Registrar General.

LAND REFERRED TO

Lot 264 in DP259877 at Campbelltown in the City of Campbelltown Parish of St.Peter County of Cumberland.

Title Diagram: DP259877

FIRST SCHEDULE

DIRECTOR, MACARTHUR GROWTH AREA.

SECOND SCHEDULE

NIL

(Page 1) Vol. 15408 Fol. 116

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

LT 2/64

Vol 15408 Fol 116

40828—4036

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR | Registrar General

DP 739663 12.2.1987

This folio is cancelled as to part [illegible] upon creation of computer folios for lots 590 & 591 on the above mentioned plan.

SECOND SCHEDULE (continued)

PARTICULARS | Registrar General | CANCELLATION

NOTATIONS AND UNREGISTERED DEALINGS

DP739663

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

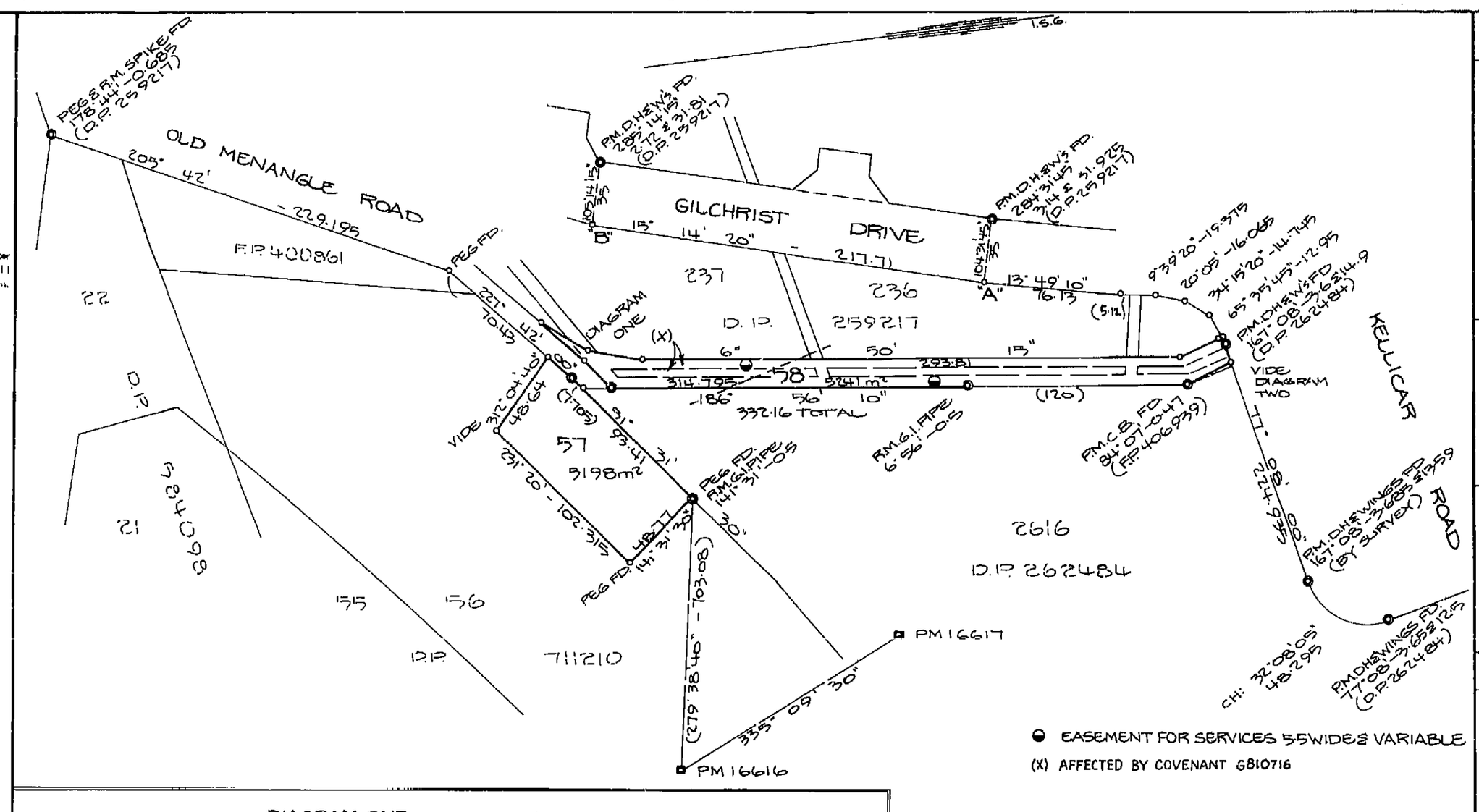
Ref:ALS /Src:T

PLAN FORM 2 — Plan Drawing only to appear in this space — *OFFICE USE ONLY

Signatures and seals only.

... Council ... Shire ... delegate of the Minister ... Planning and Assessment Act, 1979, and I ... revocation of such delegation.

... delegate of the Minister ... and Assessment Act, 1979, and I ... revocation of such delegation.



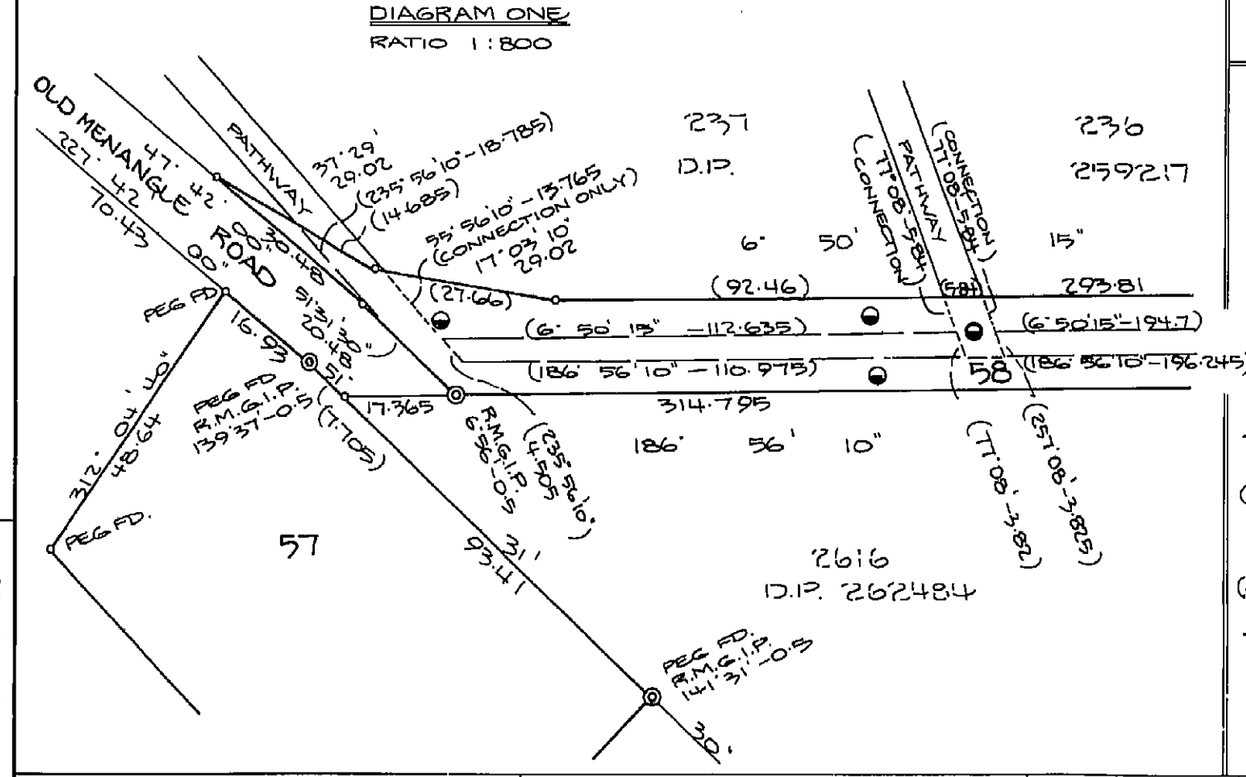


Table of mm: 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390

D.P. 736850

Registered: 20-10-1986

C.A.: 83/86 OF 19-8-1986

Title System: TORRENS

Purpose: SUBDIVISION

Ref. Map: U7322-3 #

Last Plan: D.P's. 202349, 66350, 406939

PLAN OF SUBDIVISION OF LOT 1 IN D.P.202349, PART OF THE LAND IN F.P.66350 AND PART OF LUKES ROAD, DP406939

Reduction Ratio 1: 2000
Lengths are in metres.

~~Mun./Shire~~ CAMPBELLTOWN City

Locality: CAMPBELLTOWN

Parish: ST. PETER

County: CUMBERLAND

This is sheet 1 of my plan in ... sheets. (Delete if inapplicable)

I, MICHAEL JOHN GORDON of JOHN M. DALY & ASSOCIATES, P.O. BOX 25 CAMPBELLTOWN

a surveyor registered under the Surveyors Act, 1929, as amended, hereby certify that the survey represented in this plan is accurate and has been made *(1) by me ~~*(2) under my immediate supervision~~ in accordance with the Survey Practice Regulations, 1933, and was completed on †

17-12-85

Signature

Surveyor registered under Surveyors Act, 1929, as amended. Datum Line of Azimuth: A-B

*Strike out either (1) or (2). †Insert date of survey.

Panel for use only for statements of intention to dedicate public roads or to create public reserves, drainage reserves, easements or restrictions as to user.

PURSUANT TO SECTION 88B OF THE CONVEYANCING ACT 1919-1964 AS AMENDED IT IS INTENDED TO CREATE

1. EASEMENT FOR SERVICES 5.5 WIDE & VARIABLE

ACCEPTED

Council Clerk's Certificate

I hereby certify that –

(a) the requirements of the Local Government Act, 1919 (other than the requirements for the registration of plans), and

*(b) the requirements of section 34B of the †Metropolitan Water, Sewerage and Drainage Act, 1924, as amended, †Hunter District Water, Sewerage, and Drainage Act, 1938, as amended

have been complied with by the applicant in relation to the proposed SUBDIVISION (†insert "new road", "subdivision" or "consolidated lot") set out herein

Subdivision No. 83/86

Date 19th AUGUST 1986

(Signature) ... Council Clerk

*This part of certificate to be deleted where the application is only for a consolidated lot or the opening of a new road or where the land to be subdivided is wholly outside the areas of operations of the Metropolitan Water Sewerage and Drainage Board and the Hunter District Water Board.

†Delete if inapplicable.

MPD

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

SURVEYOR'S REFERENCE 85/404 A

This negative is a photograph mode as a permanent record of a document in the custody of the Registrar General this day.

21st October, 1986

PLAN FORM 2 — Plan Drawing only to appear in this space — *OFFICE USE ONLY

Signatures and seals only.

Signed by delegate of the Growth Area, and I hereby certify that I have no notice of revocation of such delegation.

DIAGRAM 'A' (not to scale)

DIAGRAM 'B' (not to scale)

KELLICAR ROAD

TINDALL STREET

MENANGLE ROAD

GILCHRIST DRIVE

OLD MENANGLE ROAD

590 — 4·32 ha

591 — 14·11 ha.

55

(A) COVT. G 810716
(B) EXCEPTION OF MINERALS
(C) SUBJECT TO RESERVATIONS & CONDITIONS IN CROWN GRANT
(D) COVT G 610224

EASEMENT FOR SERVICE 5·5 wide & variable — D.P. 736850

D.P. 711210

PM 16618

PM 16616

Council Clerk's Certificate

I hereby certify that –

(a) the requirements of the Local Government Act, 1919 (other than the requirements for the registration of plans), and

*(b) the requirements of section 34B of the †Metropolitan Water, Sewerage and Drainage Act, 1924, as amended. †Hunter District Water, Sewerage, and Drainage Act, 1938, as amended

have been complied with by the applicant in relation to the proposed ..... SUBDIVISION ..... (Insert "new road", "subdivision" or "consolidated lot") set out hereon

Subdivision No. ..... 114/86 .....

Date ..... 3RD NOVEMBER 1986

(Signature) .....
Council Clerk

*This part of certificate to be deleted where the application is only for a consolidated lot or the opening of a new road or where the land to be subdivided is wholly outside the areas of operations of the Metropolitan Water Sewerage and Drainage Board and the Hunter District Water Board.
†Delete if inapplicable.

MPD

D P 739663

Registered: 11-2-1987

C.A.: N° 114/86 OF 3-11-1986

Title System: TORRENS

Purpose: SUBDIVISION

Ref. Map: U 7322-3 *

Last Plan: D.Ps 262484, 259217, 736850, 259877

PLAN OF SUBDIVISION OF LOTS 2610 & 2616 DP 262484
LOT 236 DP 259217
LOT 58 DP 736850
& PATHWAYS 5.5 wide {SHOWN IN L.D.P. 259217} LOTS 264 & 265 D.P. 259877

Reduction Ratio 1: 2000
Lengths are in metres.

~~Municipality~~ City: CAMPBELLTOWN

Locality: CAMPBELLTOWN

Parish: ST PETER.

County: CUMBERLAND

This is sheet 1 of my plan in ~~sheets.~~ (Delete if inapplicable).

I, NOEL FRANCIS BURTON, DVR 6000
of BURTON & FIELD pty ltd, LIVERPOOL
a surveyor registered under the Surveyors Act, 1929, as amended, hereby certify that the survey represented in this plan is accurate and has been made *(1) by me ~~(2) under my immediate supervision~~ in accordance with the Survey Practice Regulations, 1933, and was completed on † 24-7-1986

Signature .....
Surveyor registered under Surveyors Act, 1929, as amended.
Datum Line of Azimuth: 'A'-'B'
*Strike out either (1) or (2). †Insert date of survey.

Panel for use only for statements of intention to dedicate public roads or to create public reserves, drainage reserves, easements or restrictions as to user.

PLAN AMENDED IN LTO 25-2-1987

SURVEYOR'S REFERENCE 491/86/6323

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

AMENDMENTS AND/OR ADDITIONS MADE ON PLAN IN THE LAND TITLES OFFICE.

This negative is a photograph made as a permanent record of a document in the custody of the Registrar General this day. 4th March, 1987

LT 2/55

PLAN OF THE LAND COMPRISED IN DEED

BK. 3724 NO. 123

~~Mun / Shire~~: City CAMPBELLTOWN

Locality: CAMPBELLTOWN

Parish: ST PETER

County: CUMBERLAND

Reduction Ratio 1: 250

Lengths are in metres.

D. P 770632

Registered: 9.2.1988

Title System: OLD SYSTEM

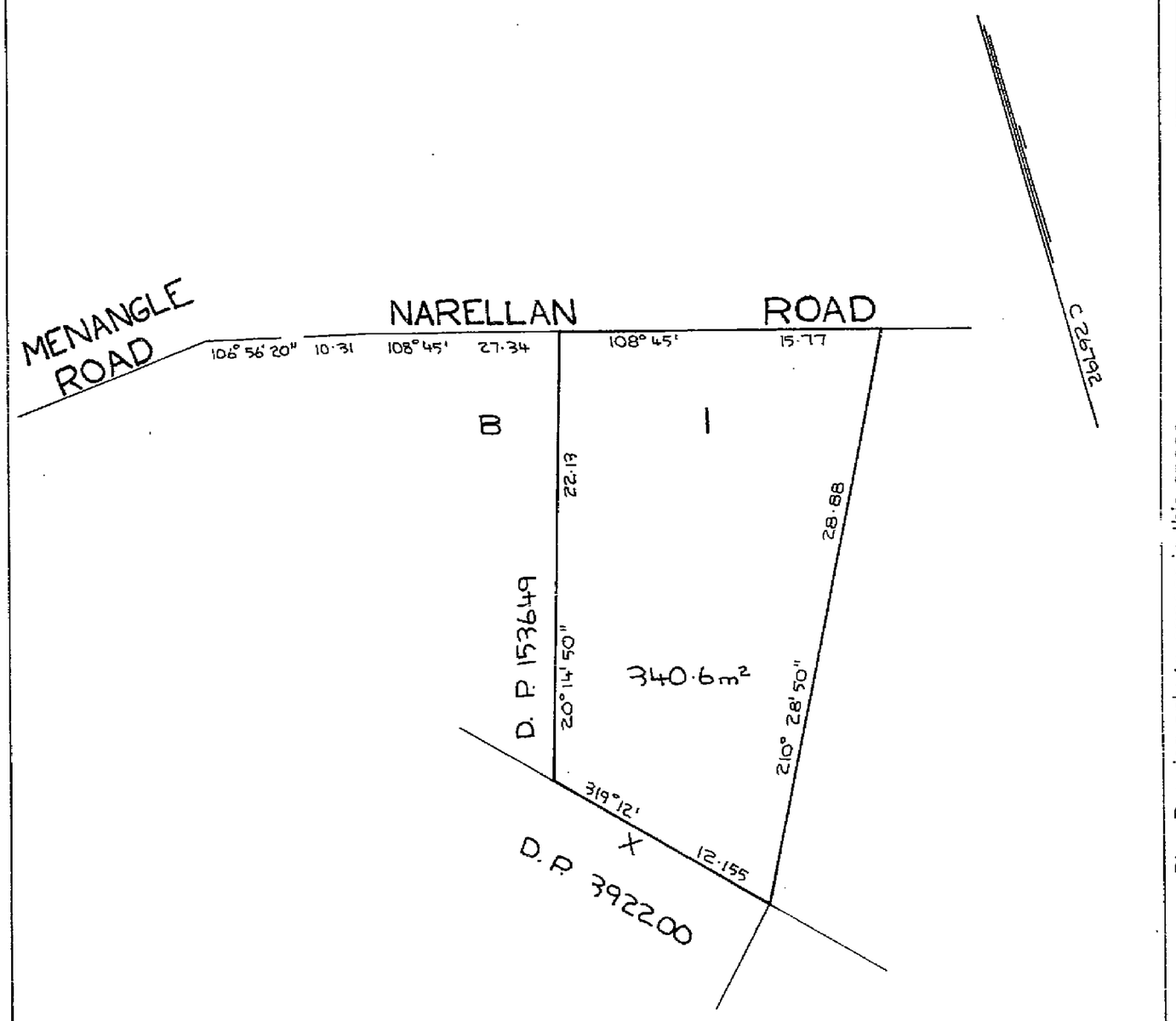
Purpose: LIMITED FOLIO CREATION

Ref Map: U7322-3 #

Last Plan: D. P 153649

NO DIAGRAM

THIS PLAN WAS PREPARED SOLELY TO IDENTIFY THE LAND IN THE ABOVE DEED.
THE BOUNDARIES HAVE NOT BEEN INVESTIGATED BY THE REGISTRAR GENERAL AND
IT IS NOT A CURRENT PLAN IN TERMS OF SEC. 327AA LOCAL GOVERNMENT ACT, 1919.



WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

10 | 50 | 100 Table of mm 140 | 180 | 220

Plan Drawing only to appear in this space

10 | 20 | 30 | 40 | 50 | 60 | 70 Table of mm | 110 | 120 | 130 | 140

This negative is a photograph made as a permanent record of a document in the custody of the Registrar General this day.

11th February, 1988

PLAN FORM 2 — Plan Drawing only to appear in this space

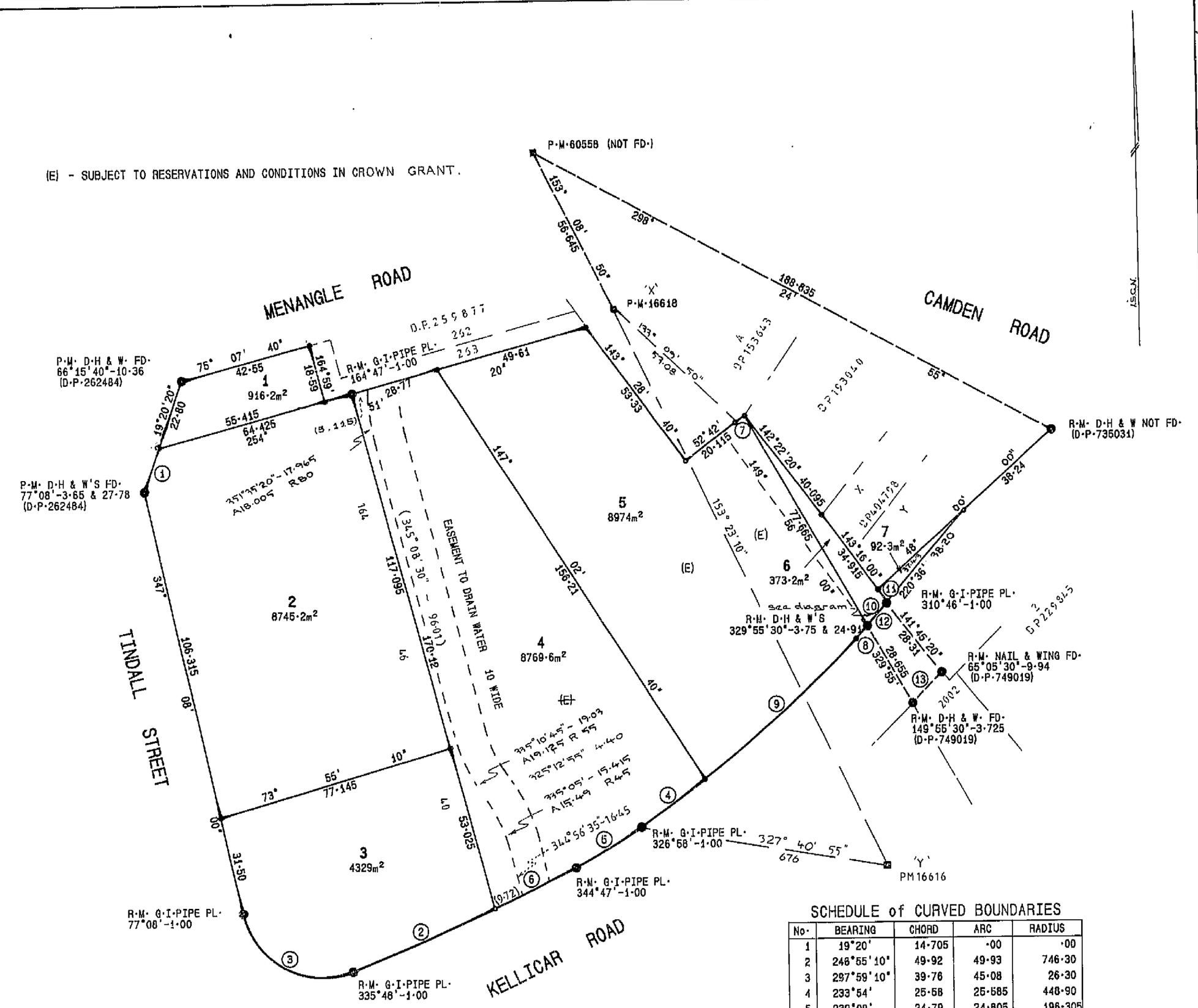
*OFFICE USE ONLY

DP 807793

SIGNATURE AND SEALS ONLY.

Signed by me BARRY LIONEL SHIELDS as delegate of the Macarthur Development Corporation, and hereby certify that I have no notice of the revocation of such delegation.

(E) - SUBJECT TO RESERVATIONS AND CONDITIONS IN CROWN GRANT.



SCHEDULE of CURVED BOUNDARIES

No·	BEARING	CHORD	ARC	RADIUS
1	19°20'	14·705	·00	·00
2	246°55'10"	49·92	49·93	746·30
3	297°59'10"	39·76	45·08	26·30
4	233°54'	25·58	25·585	446·90
5	239°09'	24·79	24·805	196·305
6	243°53'	29·105	29·105	746·30
7	55°30'	3·78	·00	·00
8	220°46'	5·625	·00	·00
9	228°03'25"	65·88	65·94	446·90
10	220°46'	9·875	·00	·00
11	323°16'	4·955	·00	·00
12	40°46'	9·43	·00	·00
13	223°51'	13·45	·00	·00

SURVEY PRACTICE REGULATION 1990 : CLAUSE 32(2)

	ISG CO-ORDINATES			
MARK	EASTING	NORTHING	ZONE	ACC
PM 16616	282264·019	1227766·781	56/1	L
PM 16618	281895·215	1228502·838	56/1	L

SOURCE : ISG CO-ORDINATES ADOPTED FROM NSW LANDS DEPARTMENT AT 29-1-1991

Diagram - not to scale

Crown Lands Office Approval

PLAN APPROVED ..... Authorised Officer

Land District .....

Paper No. .....

Field Book ..... pages .....

Council Clerk's Certificate

I hereby certify that —

(a) the requirements of the Local Government Act, 1919 (other than the requirements for the registration of plans), and

†(b) the requirements of section 340 of the † Metropolitan Water, Sewerage and Drainage Act, 1924, as amended, † Hunter District Water, Sewerage, and Drainage Act, 1938, as amended

have been complied with by the applicant in relation to the proposed Subdivision (Insert "new road", "subdivision" or "consolidated lot") set out herein

Subdivision No. 211 of 1990

Date 12th December 1990.

(Signature) ..... Council Clerk

Council File No. 29229

*This part of certificate to be deleted where the application is only for a consolidated lot or the opening of a new road or where the land to be subdivided is wholly outside the areas of operations of the Metropolitan Water Sewerage and Drainage Board and the Hunter District Water Board.

† Delete if inapplicable.

SURVEYOR'S REFERENCE: 89420

Registered: 21·3·1991

C.A: No 211 OF 12-12-1990

Title System: TORRENS

Purpose: SUBDIVISION

Ref. Map: U7322-3 #, U8222-13 #

Last Plan: DP740386 DP735031

PLAN
OF SUBDIVISION OF
LOT 2001 IN D.P.740386
& LOT 102 IN D.P.735031

Lengths are in metres. Reduction Ratio 1: 1000

Mun./Shire / City: CAMPBELLTOWN

Locality: CAMPBELLTOWN

Parish: ST. PETER

County: CUMBERLAND

~~This is sheet 1 of my plan/a~~ ~~sheets~~ (Delete if inapplicable).

I, JOHN.S.MCDONALD
JOHN.S.MCDONALD.&.ASSOCIATES.
P.O. BOX 149, MINTO. 2566.
of PH... (02)···603·1600

a surveyor registered under the Surveyors Act, 1929, as amended, hereby certify that the survey represented in this plan is accurate and has been made in accordance with the Survey Practice Regulations, 1933 and any special requirements of the Department of Lands, and was completed on

21/1/90

Signature ..... Surveyor, registered under Surveyors Act, 1929, as amended.

Datum Line of Azimuth. 'X' - 'Y'

Insert date of survey.

Plans used in preparation of survey/~~compilation~~.

D.P.740386
D.P.735031

PANEL FOR USE ONLY for statements of intention to dedicate public roads or to create public reserves, drainage reserves, easements or restrictions as to user.

PURSUANT TO SECTION 88B OF THE CONVEYANCING ACT, 1919-1964 AS AMENDED IT IS INTENDED TO CREATE :
1. EASEMENT TO DRAIN WATER 10 WIDE

ACCEPTED
Town Clerk

PLAN AMENDED IN LTO AT SURVEYOR'S REQUEST

1: Alterations & Additions by me 15/2/91

MPD

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

This negative is a photograph made as a permanent record of a document in the custody of the Registrar General this day. 22nd March, 1991

PLAN FORM 1 — Plan Drawing only to appear in this space — *OFFICE USE ONLY

SIGNATURES, SEALS AND STATEMENTS of intention to dedicate public roads or to create public reserves, drainage reserves, easements, restrictions on the use of land or positive covenants.

IT IS INTENDED TO DEDICATE THE LAND MARKED ROAD WIDENING TO THE PUBLIC AS ROAD.

The Common Seal of the Council of the City of Campbelltown was hereto affixed by virtue of a resolution passed by Council on the 1st day of September 1998

..... COUNCILLOR

..... GENERAL MANAGER

Crown Lands Office Approval

PLAN APPROVED .....
Authorised Officer
Land District .....
Paper No. .....
Field Book ..... *pages* .....

Council's Certificate

I hereby certify that –

(a) the requirements of the Local Government Act, 1919 (other than the requirements for the registration of plans), and

**(b) the requirements of † Part 3 Division 2 of the Water Board Act 1987, or † Part 5 Division 7 of the Hunter Water Board (Corporatisation) Act 1991.*

have been complied with by the applicant in relation to the proposed CONSOLIDATED LOT
(Insert "new road", "subdivision" or "consolidated lot") set out herein

Subdivision No. 81 of 1998

Date 6TH NOVEMBER 1998

(Signature) .....
~~General Manager~~/Authorised Person

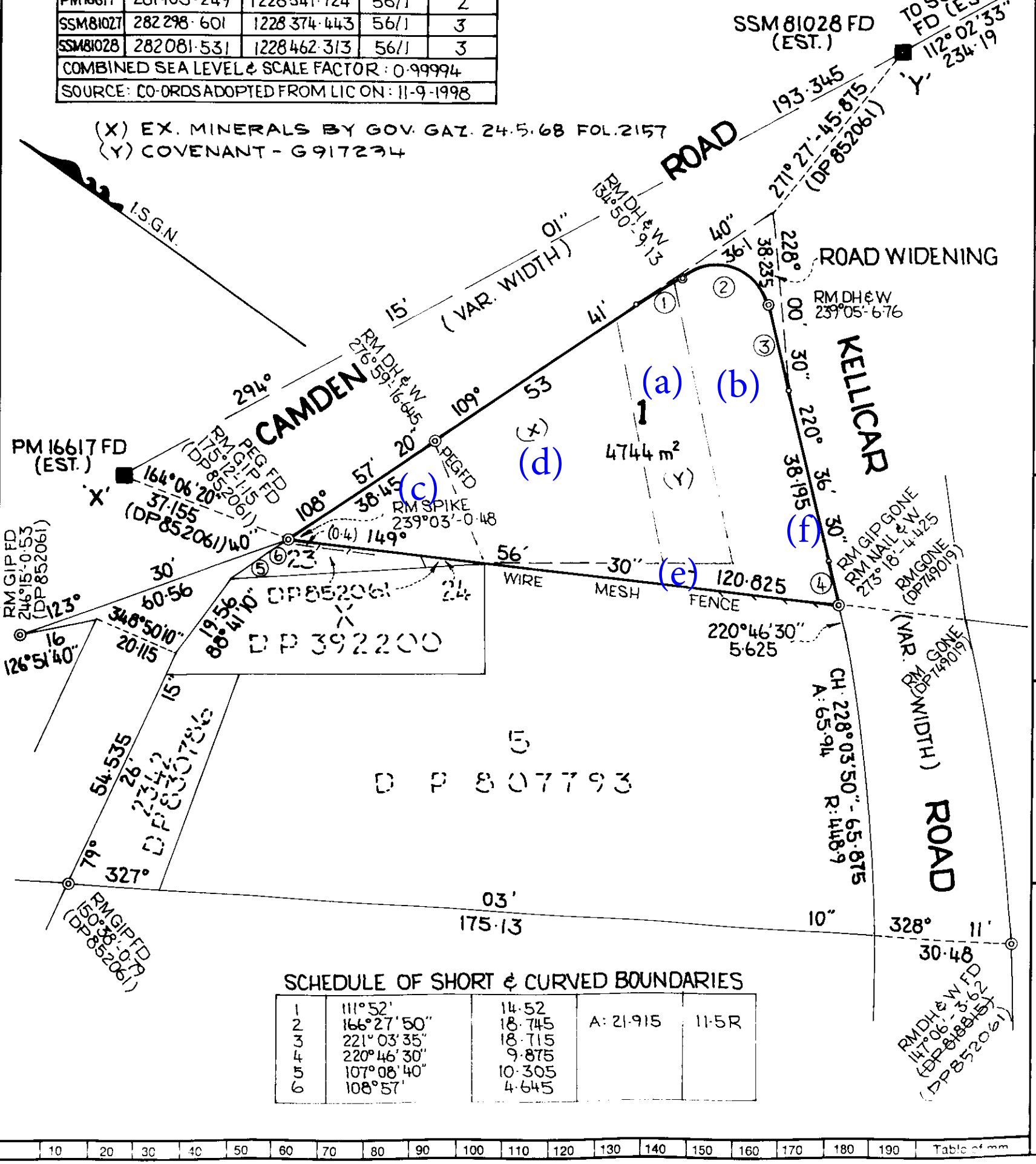
Council File No. 83995

**This part of certificate to be deleted where the application is only for a consolidated lot or the opening of a new road or where the land to be subdivided is wholly outside the areas of operations of the Water Board and the Hunter Water Corporation Ltd.*

†Delete if inapplicable

SURVEY PRACTICE REGULATIONS 1990: CLAUSE 32(2)				
MARK	I.S.G. CO-ORDINATES		ZONE	ACC
	EASTING	NORTHING		
PM16617	281905·249	1228541·724	56/1	2
SSM81027	282298·601	1228374·443	56/1	3
SSM81028	282081·531	1228462·313	56/1	3
COMBINED SEA LEVEL & SCALE FACTOR: 0·99994				
SOURCE: CO-ORDS ADOPTED FROM LIC ON: 11-9-1998				

(X) EX. MINERALS BY GOV. GAZ. 24.5.68 FOL.2157
(Y) COVENANT - G917234



SCHEDULE OF SHORT & CURVED BOUNDARIES

1	111° 52'	14·52	A: 21·915	11·5R
2	166° 27' 50"	18·745		
3	221° 03' 35"	18·715		
4	220° 46' 30"	9·875		
5	107° 08' 40"	10·305		
6	108° 57'	4·645		

10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 Table of mm

DP 883417

Registered: 15·2·1999

C.A: Nº 81 OF 1998 OF 6.11.1998

Title System: TORRENS AND OLD SYSTEM

Purpose: CONSOLIDATION

Ref. Map: U7322-3, U8222-13

Last Plan: DP 852061, DP 807793, DP 404798, DP 193040

PLAN OF CONSOLIDATION OF LOTS 13 & 14 IN DP 852061, 6 & 7 IN DP 807793, LOT X & Y IN DP 404798 & PT POR 74 IN DP 193040.

Lengths are in metres. Reduction Ratio 1: 1000

LGA CAMPBELLTOWN

Suburb/~~Locality~~: CAMPBELLTOWN

Parish: ST. PETER

County: CUMBERLAND

Plans used in preparation of survey/~~compilation~~.
DP's: 852061, 404798, 807793, 193040, 818815

I, STEPHEN THOMAS DIKE
of BURTON & FIELD Pty Ltd
DX 5020 LIVERPOOL,
a surveyor registered under the Surveyors Act 1929, hereby certify that the survey represented in this plan is accurate, has been made in accordance with the Surveyors (Practice) Regulation 1996 and was completed on 2-10-98

The survey relates to LOT 1
(here specify the land actually surveyed, or specify any land shown in the plan that is not the subject of the survey)

(Signature) .....

Datum Line 'X'-'Y'
Zone Suburban/~~Country~~

Surveyor registered under the Surveyors Act 1929

PLAN AMENDED IN LTO AT SURVEYOR'S REQUEST

SURVEYOR'S REFERENCE: S1344/98-37742 CHECKLIST

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 1/883417

SEARCH DATE	TIME	EDITION NO	DATE
19/8/2020	10:39 AM	1	15/2/1999

LAND

LOT 1 IN DEPOSITED PLAN 883417
AT CAMPBELLTOWN
LOCAL GOVERNMENT AREA CAMPBELLTOWN
PARISH OF ST PETER COUNTY OF CUMBERLAND
TITLE DIAGRAM DP883417

FIRST SCHEDULE

CAMPBELLTOWN CITY COUNCIL

SECOND SCHEDULE (3 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 LAND EXCLUDES MINERALS AS REGARDS THE PART RESUMED BY GOV. GAZ. 24.5.68 FOL 2157 SHOWN DESIGNATED (X) IN THE TITLE DIAGRAM
3 G917234 COVENANT AFFECTING THE PART SHOWN SO BURDENED IN THE TITLE DIAGRAM.

NOTATIONS

NOTE: THE CERTIFICATE OF TITLE FOR THIS FOLIO OF THE REGISTER DOES NOT INCLUDE SECURITY FEATURES INCLUDED ON COMPUTERISED CERTIFICATES OF TITLE ISSUED FROM 4TH JANUARY, 2004. IT IS RECOMMENDED THAT STRINGENT PROCESSES ARE ADOPTED IN VERIFYING THE IDENTITY OF THE PERSON(S) CLAIMING A RIGHT TO DEAL WITH THE LAND COMPRISED IN THIS FOLIO.
DP1160704 NOTE: PLAN FOR ROADS ACT, 1993
DP1165442 NOTE: PLAN OF ACQUISITION FOR ROADS ACT 1993

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

advlegs PRINTED ON 19/8/2020

Section 10.7 Certificates

Issue Date: 19 August 2020
Application Number: 202002983
Receipt Number: 4823720

JK Environments Pty Ltd
PO Box 976
NORTH RYDE BC NSW 1670

Your Reference: E33438PL

PLANNING CERTIFICATE UNDER SECTION 10.7 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Section 10.7 Planning Certificate phone enquiries: (02) 4645 4560.

Property Address: Lot 1 Camden Road
CAMPBELLTOWN NSW 2560

Property Description: Lot 1 DP 883417

As at the date of issue, the following matters apply to the land subject of this certificate:

INFORMATION PROVIDED UNDER SECTION 10.7(2) OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979 (the Act)

PART 1 – Names of relevant planning instruments and DCPs

Planning Instrument: Campbelltown LEP 2015
Effect: B4 Mixed Use

(1) The following environmental planning instruments apply to the carrying out of development on the land subject of this certificate:

Local environmental plans (LEPs) and deemed environmental planning instruments

Campbelltown LEP 2015

For further information about these local environmental plans and deemed environmental planning instruments, contact Council's Environmental Planning Section on (02) 4645 4608.

State environmental planning policies (SEPPs)

SEPP No.21 – Caravan Parks

SEPP No.30 – Intensive Agriculture

SEPP No.33 – Hazardous and Offensive Development

SEPP No.50 – Canal Estate Development

SEPP No.55 – Remediation of Land

SEPP No.64 – Advertising and Signage

SEPP No.65 – Design Quality of Residential Apartment Development

SEPP No.70 – Affordable Housing (Revised Schemes)

SEPP (Vegetation in Non-Rural Areas) 2017

SEPP (Sydney Region Growth Centres) 2006

SEPP (Housing for Seniors or People with a Disability) 2004

SEPP No.19 - Bushland in Urban Areas

SEPP (Building Sustainability Index: BASIX) 2004

SEPP (State Significant Precincts) 2005

SEPP (Mining, Petroleum Production and Extractive Industries) 2007

SEPP (Miscellaneous Consent Provisions) 2007

SEPP (Infrastructure) 2007

SEPP (Exempt and Complying Development Codes) 2008

SEPP (Affordable Rental Housing) 2009

SEPP (State and Regional Development) 2011

SEPP (Educational Establishments and Child Care Facilities) 2017

SEPP (Koala Habitat Protection) 2019

Greater Metropolitan REP No.2 - Georges River Catchment

For further information about these State environmental planning policies, contact the Department of Planning and Environment (www.planning.nsw.gov.au).

(2) The following proposed environmental planning instruments, which are or have been the subject of community consultation or on public exhibition under the Act (unless the Director-General has notified Council that the making of the proposed instrument has been deferred indefinately or has not been approved), will apply to the carrying out of development on the land subject of this certificate:

Draft local environmental plans (LEPs)

Draft Campbelltown LEP 2015 (Amendment No. 24)

For further information about these draft local environmental plans, contact Council's Environmental Planning Section on (02) 4645 4608.

Draft State environmental planning policies (SEPPs)

None

For further information about these draft State environmental planning policies, contact the Department of Planning and Environment (www.planning.nsw.gov.au).

(3) The following development control plans (DCPs) apply to the carrying out of development on the land subject of this certificate:

Campbelltown (Sustainable City) DCP 2015

For further information about these development control plans, contact Council's Environmental Planning Section on (02) 4645 4608. Please note that the names of any draft development control plans that apply to the land subject of this certificate, that have been placed on exhibiton by Council but have not yet come into effect, are provided as advice under section 10.7(5) of the Act.

PART 2 – Zoning and land use under relevant LEPs

a) The following zone(s) apply to the land subject of this certificate:

B4 Mixed Use

b) The purposes for which the plan or instrument provides that development may be carried out without the need for development consent are detailed in the land use table for each zone. Reference should be made to either Attachment 1 to this certificate or the appropriate section of the attached copy of the plan or instrument.

In addition, SEPP (Exempt and Complying Development Codes) 2008 and clause 3.1 of the Campbelltown LEP 2015 allow certain types of development to be carried out as exempt development within the Campbelltown City local government area.

c) The purposes for which the plan or instrument provides that development may not be carried out except with development consent are detailed in the land use table for each zone. Reference should be made to either Attachment 1 to this certificate or the appropriate section of the attached copy of the plan or instrument.

In addition, SEPP (Exempt and Complying Development Codes) 2008 and clause 3.2 of the Campbelltown LEP 2015 allow certain types of development to be carried out as complying development within the Campbelltown City local government area after a complying development certificate has been obtained from Council or from an accredited certifier. Clause 2.5 of the Campbelltown LEP 2015 also allows for additional permitted uses with development consent on particular land.

d) The purposes for which the plan or instrument provides that development is prohibited are detailed in the land use table for each zone. Reference should be made to either Attachment 1 to this certificate or the appropriate section of the attached copy of the plan or instrument.

e) Any development standards applying to the land subject of this certificate that fix minimum land dimensions for the erection of a dwelling-house and, if so, the minimum land dimensions so fixed are detailed in the relevant section of the plan or instrument. Reference should be made to either Attachment 2 to this certificate or the appropriate section(s) of the attached copy of the plan or instrument. In addition, certain Council development control plans may impose minimum development standards for the creation of allotments and/or minimum site area and dimensions for the erection of a dwelling-house.

For further information about items a), b), c), d) and e) above, contact Council's Environmental Planning Section on (02) 4645 4608.

f) The land subject of this certificate does not include or comprise critical habitat.

g) The land subject of this certificate is not in a conservation area (however described).

h) No item of environmental heritage (however described) is situated on the land subject of this certificate.

PART 2A – Zoning and land use under State Environmental Planning Policy (Sydney Region Growth Centres) 2006

None

PART 3 – Complying development

(1) Complying development may be carried out on the land subject of this certificate under each of the following codes for complying development, to the extent shown, because of the provisions of clauses 1.17A(1)(c) to (e), (2), (3) and (4), 1.18(1)(c3) and 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008:

Housing Code – on all of the land

Housing Alterations Code – on all of the land

Commercial and Industrial Alterations Code – on all of the land

Subdivisions Code – on all of the land

Rural Housing Code – on all of the land

General Development Code – on all of the land

Demolition Code – on all of the land

Commercial and Industrial (New Buildings and Additions) Code – on all of the land

Fire Safety Code – on all of the land

Low Rise Housing Diversity Code – on all of the land

Container Recycling Facilities Code – on all of the land

Please note that reference should also be made to the relevant parts of this policy for the general requirements for complying development and to the relevant codes for complying development which may also include provisions relating to zoning, lot size etc.

(2) Complying development may not be carried out on the land subject of this certificate under each of the following codes for complying development, to the extent shown and for the reason(s) stated, because of the provisions of clauses 1.17A(1)(c) to (e), (2), (3) and (4), 1.18(1)(c3) and 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008:

Greenfield Housing Code – on any part of the land
(Note: the Greenfield Housing Code only applies within the Greenfield Housing Code Area)

PART 4 – Coastal protection

The land subject of this certificate is not affected by the operation of section 38 or 39 of the Coastal Protection Act 1979, but only to the extent that Council has been notified by the Department of Finance, Services and Innovation.

Please note that Campbelltown City Council is not defined as a coastal council under the Coastal Protection Act 1979.

PART 5 – Mine subsidence

The land subject of this certificate is not within a proclaimed Mine Subsidence District within the meaning of the Coal Mine Subsidence Compensation Act 2017.

PART 6 – Road widening and road realignment

The land subject of this certificate is not affected by any road widening or road realignment under Division 2 of Part 3 of the Roads Act 1993, any environmental planning instrument or any resolution of Council.

PART 7 – Council and other public authority policies on hazard risk restrictions

a) Council has adopted a policy with respect to all land within the Campbelltown City local government area with unusual site conditions. This policy restricts the development of land where extensive earthworks and/or filling has been carried out. Land, the development of which is restricted by this policy, has a restriction as to user placed on the title of the land stating the details of any restriction. Building lots can be affected by excessive land gradient, filling, reactive or dispersive soils, overland flow and/or mine subsidence. Buildings, structures or site works may require specific structural design to ensure proper building construction. Consequently, some applications may require the submission of structural design details and geotechnical reports. It is suggested that prior to lodging an application, enquiries be made to Council's Planning and Environment Division to ascertain any specific requirements.

b) Council has adopted by resolution the certified Campbelltown LGA Bush Fire Prone Land Map. This map identifies bush fire prone land within the Campbelltown City local government area as defined in section 10.3 of the Act. Where the land subject of this certificate is identified as bush fire prone land, the document entitled "Planning for Bush Fire Protection" prepared by the NSW Rural Fire Service in co-operation with the Department of Planning and dated November 2019 should be consulted with regards to possible restrictions on the development of the land because of the likelihood of bushfire.

c) The land subject of this certificate is not affected by a policy adopted by Council or adopted by any other public authority and notified to Council for reference in a planning certificate that restricts the development of the land because of the likelihood of tidal inundation.

d) The land subject of this certificate is not affected by a policy adopted by Council or adopted by any other public authority and notified to Council for reference in a planning certificate that restricts the development of the land because of the likelihood of acid sulphate soils.

e) Council has adopted by resolution a policy on contaminated land which may restrict the development of the land subject of this certificate. This policy is implemented when zoning or land use changes are proposed on lands which have previously been used for certain purposes. Council records do not have sufficient information about previous use of this land to determine whether the land is contaminated. Consideration of Council's adopted policy and the application of provisions under relevant State legislation is warranted.

PART 7A – Flood related development controls information

(1) Development on all or part of the land subject of this certificate for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) is subject to flood related controls.

(2) Development on all or part of the land subject of this certificate for any other purpose is subject to flood related development controls.

(3) Words and expressions in this clause have the same meanings as in the instrument set out in the Schedule to the Standard Instrument (Local Environmental Plans) Order 2006.

Please note that some additional information regarding flooding and flood related development controls may be provided as advice under section 10.7(5) of the Act.

PART 8 – Land reserved for acquisition

An environmental planning instrument, deemed environmental planning instrument or draft environmental planning instrument applying to the land subject of this certificate provides for the acquisition of all or part of the land by a public authority, as referred to in section 3.15 of the Act.

PART 9 – Contribution plans

The following contribution plan(s) apply to the land subject of this certificate:

Campbelltown Local Infrastructure Contributions Plan 2018

Contributions Plan – Public Car Parking Facilities (Campbelltown and Ingleburn Business Centres)

For further information about these contribution plans, contact Council's Environmental Planning Section on (02) 4645 4608.

PART 9A – Biodiversity certified land

The land subject of this certificate is not biodiversity certified land under Part 8 of the Biodiversity Conservation Act 2016.

Please note that biodiversity certified land includes land certified under Part 7AA of the Threatened Species Conservation Act 1995 that is taken to be certified under Part 8 of the Biodiversity Conservation Act 2016.

PART 10 – Biobanking agreement

The land subject of this certificate is not a biodiversity stewardship site under a biodiversity stewardship agreement under Part 5 of the Biodiversity Conservation Act 2016 (but only in so far as Council has been notified of the existence of such an agreement by the Chief Executive of the Office of Environment and Heritage).

Please note that biodiversity stewardship agreements include biobanking agreements under Part 7A of the Threatened Species Conservation Act 1995 that are taken to be biodiversity stewardship agreements under Part 5 of the Biodiversity Conservation Act 2016.

PART 10A – Native vegetation clearing set asides

The land subject of this certificate does not contain a set aside under section 60ZC of the Local Land Services Act 2013 (but only in so far as Council has been notifed of the existance of such a set aside area by Local Land Services or it is registered in the public register under that section).

PART 11 – Bush fire prone land

None of the land subject of this certificate has been identified as bush fire prone land on the Campbelltown City Council - Bush Fire Prone Land Map that has been certified for the purposes of section 10.3(2) of the Act.

PART 12 – Property vegetation plans

No property vegetation plan applies to the land subject of this certificate.

Please note that the whole of the Campbelltown City local government area is excluded from the operation of the Native Vegetation Act 2003.

PART 13 – Orders under Trees (Disputes Between Neighbours) Act 2006

No order has been made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land subject of this certificate (but only to the extent that Council has been notified of any such orders).

PART 14 – Directions under Part 3A

No direction, in force under section 75P(2)(c1) of the Act, that a provision of an environmental planning instrument prohibiting or restricting the carrying out of a project or a stage of a project on the land subject of this certificate under Part 4 of the Act does not have effect, has been issued by the Minister.

PART 15 – Site compatibility certificates and conditions for seniors housing

a) No current site compatibility certificate (seniors housing), of which Council is aware, exists in respect of proposed development on the land subject of this certificate.

b) No conditions of consent to a development application, granted after 11 October 2007, of the kind referred to in clause 18(2) of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 have been imposed in respect of proposed development on the land subject of this certificate.

PART 16 – Site compatibility certificates for infrastructure

No valid site compatibitlity certificate (infrastructure), of which Council is aware, exists in respect of proposed development on the land subject of this certificate.

PART 17 – Site compatibility certificates and conditions for affordable rental housing

(1) No current site compatibility certificate (affordable rental housing), of which Council is aware, exists in respect of proposed development on the land subject of this certificate.

(2) No conditions of consent to a development application of the kind referred to in clause 17(1) or 37(1) of State Environmental Planning Policy (Affordable Rental Housing) 2009 have been imposed in respect of proposed development on the land subject of this certificate.

PART 18 – Paper subdivision information

(1) No adopted development plan or development plan that is proposed to be subject to a consent ballot apply to the land subject of this certificate.

(2) No subdivision order applies to the land subject of this certificate.

PART 19 – Site verification certificates

No current site verification certificate issued under Division 3 of Part 4AA of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (of which Council is aware) applies to the land subject of this certificate.

PART 20 – Loose-fill asbestos insulation

No residential dwelling erected on the land subject of this certificate has been identified in the Loose-Fill Asbestos Insulation Register as containing loose-fill asbestos ceiling insulation.

For more information contact NSW Fair Trading (www.fairtrading.nsw.gov.au)

PART 21 – Affected building notices and building product rectification orders

(1) No affected building notice of which Council is aware is in force in respect of the land subject of this certificate.

(2)

(a) No building product rectification order of which Council is aware and that has not been fully complied with is in force in respect of the land subject of this certificate.

(b) No notice of intention to make a building product rectification order of which Council is aware and that is outstanding has been given in respect of the land subject of this certificate.

(3) In this clause: affected building notice has the same meaning as in Part 4 of the Building Products (Safety) Act 2017 and building product rectification order has the same meaning as in the Building Products (Safety) Act 2017.

Matters prescribed by section 59(2) of the Contaminated Land Management Act 1997

(a) The land subject of this certificate is not significantly contaminated land within the meaning of the Contaminated Land Management Act 1997.

(b) The land subject of this certificate is not subject to a management order within the meaning of the Contaminated Land Management Act 1997.

(c) The land subject of this certificate is not the subject of an approved voluntary management proposal within the meaning of the Contaminated Land Management Act 1997.

(d) The land subject of this certificate is not subject to an ongoing maintenance order within the meaning of the Contaminated Land Management Act 1997.

(e) The land subject of this certificate is not the subject of a site audit statement within the meaning of the Contaminated Land Management Act 1997 provided to Council.

INFORMATION PROVIDED UNDER SECTION 10.7(5) OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Council has completed a flood study of the Bow Bowing / Bunbury Curran Creek Catchment, of which this property is a part. The results of this study have improved Council's understanding of flood behaviour in the catchment. The next stage is preparation of a Floodplain Risk Management Study and Plan which will be presented to council for adoption early in 2019.

All properties within the Campbelltown City local government area may be affected by flooding caused by overland flow or local topography. Applicants will need to make their own assessment of the risk associated with these matters. For more information, please complete a Stormwater Advice Request Form that is available on Council's website or by contacting Council on 4645 4000.

Council has received a copy of the map "Salinity Potential in Western Sydney - 2002" from the Department of Infrastructure, Planning and Natural Resources (DIPNR). This map classifies the land within the Campbelltown City local government area as having either known salinity, high salinity potential, moderate salinity potential or low salinity potential. Salinity issues may be of relevance to any development of the land subject of this certificate. For further information, contact the Department of Infrastructure, Planning and Natural Resources (www.dipnr.nsw.gov.au).

It should be noted that the Commonwealth Department of Infrastructure and Regional Development has released a document titled "Preliminary Flight Paths" purporting to provide preliminary information on jet aircraft flight paths and flight zones for each of the design options for the Second Sydney Airport Proposals. Some of the flight paths and flight zones shown in this document may, if implemented, impact upon the environment in the vicinity of the land subject of this certificate. Further enquiries in respect of this document should be directed initially to the Commonwealth Department of Infrastructure and Regional Development.

The land subject of this certificate has a boundary to a controlled access road.

The following draft development control plans (DCPs), that have been placed on exhibition by Council but which have not yet come into effect, apply to the land subject of this certificate:

None

For further information about these draft development control plans, contact Council's Environmental Planning Section on (02) 4645 4608.

Jim Baldwin, per
Director City Development

Attachment 1

Campbelltown Local Environmental Plan 2015

Zone B4 Mixed Use

1 Objectives of zone

- To provide a mixture of compatible land uses.
- To integrate suitable business, office, residential, retail and other development in accessible locations so as to maximise public transport patronage and encourage walking and cycling.
- To encourage the timely renewal and revitalisation of centres that are undergoing growth or change.
- To create vibrant, active and safe communities and economically sustainable employment centres.
- To provide a focal point for commercial investment, employment opportunities and centre-based living.
- To encourage the development of mixed-use buildings that accommodate a range of uses, including residential uses, and that have high residential amenity and active street frontages.
- To facilitate diverse and vibrant centres and neighbourhoods.
- To achieve an accessible, attractive and safe public domain.

2 Permitted without consent

Nil

3 Permitted with consent

Amusement centres; Boarding houses; Car parks; Child care centres; Commercial premises; Community facilities; Educational establishments; Entertainment facilities; Environmental facilities; Environmental protection works; Flood mitigation works; Function centres; Helipads; Home businesses; Home occupations; Hotel or motel accommodation; Information and education facilities; Medical centres; Mortuaries; Passenger transport facilities; Places of public worship; Recreation areas; Recreation facilities (indoor); Recreation facilities (outdoor); Registered clubs; Residential flat buildings; Respite day care centres; Restricted premises; Roads; Seniors housing; Service stations; Serviced apartments; Shop top housing; Signage; Veterinary hospitals

4 Prohibited

Any development not specified in item 2 or 3

NOTE: A copy of the complete written instrument for the Campbelltown Local Environmental Plan 2015 is available on the NSW Legislation website at: http://www.legislation.nsw.gov.au

Attachment 2

Campbelltown Local Environmental Plan 2015

4.1 Minimum subdivision lot size

(1) The objectives of this clause are as follows:

(a) to ensure that the density of development is compatible with the capacity of existing and proposed infrastructure,

(b) to ensure that the density of settlement will be compatible with the objectives of the zone,

(c) to limit the density of settlement in environmentally, scenically or historically sensitive areas,

(d) to ensure lot sizes are compatible with the conservation of natural systems, including waterways, riparian land and groundwater dependent ecosystems,

(e) to facilitate viable agricultural undertakings,

(f) to protect the curtilage of heritage items and heritage conservation areas,

(g) to facilitate a diversity of housing forms.

(2) This clause applies to a subdivision of any land shown on the Lot Size Map that requires development consent and that is carried out after the commencement of this Plan.

(3) The size of any lot resulting from a subdivision of land to which this clause applies is not to be less than the minimum size shown on the Lot Size Map in relation to that land.

(4) This clause does not apply in relation to the subdivision of individual lots in a strata plan or community title scheme.

(4A) If a lot is a battle-axe lot or other lot with an access handle, the area of the access handle is not to be included in calculating the lot size.

(4B) Despite subclause (3), development consent may be granted for the subdivision of land into lots that do not meet the minimum size shown on the Lot Size Map if the lots are residue lots resulting

4.1AA Minimum subdivision lot size for community title schemes

(1) The objectives of this clause are as follows:

(a) to provide for the proper and orderly development of land,

(b) to ensure that land developed under the *Community Land Development Act 1989* will achieve densities consistent with the objectives of the zone,

(c) to protect the curtilage of heritage items and heritage conservation areas.

(2) This clause applies to a subdivision (being a subdivision that requires development consent) under the *Community Land Development Act 1989* of land in any of the following zones:

(a) Zone RU2 Rural Landscape,

(b) Zone R2 Low Density Residential,

(c) Zone R3 Medium Density Residential,

(d) Zone R5 Large Lot Residential,

(e) Zone E3 Environmental Management,

(f) Zone E4 Environmental Living.

(3) The size of any lot resulting from a subdivision of land to which this clause applies (other than any lot comprising association property within the meaning of the *Community Land Development Act 1989*) is not to be less than the minimum size shown on the Lot Size Map in relation to that land.

4.1A Maximum dwelling density in certain residential areas

(1) The objectives of this clause are as follows:

(a) to restrict the dwelling yield on certain land,

(b) to ensure that infrastructure is not overburdened,

(c) to provide for a diversity of dwelling types.

(2) This clause applies to land identified as "Restricted dwelling yield" on the Restricted Dwelling Yield Map.

(3) Despite clauses 4.1, 4.1AA, 4.1B and 4.1C, the total number of dwellings that may be created by the development of land specified in Column 1 of the table to this clause must not exceed the number specified in Column 2 of the table.

Column 1	Column 2
"Area 1" on the Restricted Dwelling Yield Map, being land at Airds-Bradbury	2104
"Area 2" on the Restricted Dwelling Yield Map, being land at Claymore	1490
"Area 3"on the Restricted Dwelling Yield Map, being land at the Western Sydney University	850

4.1B Minimum subdivision lot sizes for dual occupancies in certain zones

(1) The objectives of this clause are as follows:

(a) to achieve planned residential density in certain zones,

(b) to ensure that lot sizes are consistent with the predominant subdivision pattern of the area and maintain a low density residential character in existing neighbourhoods,

(c) to facilitate development applications seeking concurrent approval for dual occupancy development and subdivision,

(d) to prevent the fragmentation of land.

(2) Despite clause 4.1, development consent may be granted to development for the purpose of a dual occupancy if the development will be on a lot that is at least the minimum size shown on the Lot Size for Dual Occupancy Development Map in relation to that land.

(3) Despite clause 4.1 and subclause (2), development consent may be granted for the subdivision of land in Zone R2 Low Density Residential into lots that

are less than the minimum lot size shown on the Lot Size Map in relation to that land if:

(a) there is an existing dual occupancy on the land that was lawfully erected under an environmental planning instrument or there is a development application for the concurrent approval of a dual occupancy and its subdivision into 2 lots, and

(b) the lot size of each resulting lot will be at least 300 square metres, and

(c) the subdivision will not result in more than one principal dwelling on each resulting lot.

4.1C Minimum qualifying site area and lot size for certain residential and child care centre development in residential zones

(1) The objectives of this clause are as follows:

(a) to achieve planned residential densities in certain zones,

(b) to achieve satisfactory environmental and infrastructure outcomes,

(c) to minimise any adverse impact of development on residential amenity,

(d) to minimise land use conflicts.

(2) Development consent may be granted to development for a purpose specified in the table to this clause on land in a zone listed beside the purpose, if the area of the lot is equal to or greater than the area specified in Column 3 of the table.

(3) Development consent may be granted to the subdivision of land in a zone that is specified in the table to this clause for a purpose listed beside the zone, if the area of the lot to be created is equal to or greater than the area specified in Column 4 of the table.

Column 1	Column 2	Column 3	Column 4
Dwelling house	Zone R2 Low Density Residential	500 square metres	500 square metres
Dual occupancy	Zone R2 Low Density Residential	700 square metres	300 square metres
Semi-detached dwelling	Zone R2 Low Density Residential	700 square metres	300 square metres
Attached dwelling	Zone R2 Low Density Residential	1,000 square metres	300 square metres
Child care centres	Zone R2 Low Density Residential or Zone R3 Medium Density Residential	800 square metres	N/A
Residential flat buildings	Zone R4 High Density Residential	1,200 square metres	1,200 square metres

4.1D Minimum lot sizes for certain land uses in certain environment protection zones

(1) The objectives of this clause are as follows:

(a) to allow for certain non-residential land uses,

(b) to minimise any adverse impact on local amenity and the natural environment,

(c) to achieve satisfactory environmental and infrastructure outcomes,

(d) to minimise land use conflicts.

(2) This clause applies to land in the following zones:

(a) Zone E3 Environmental Management,

(b) Zone E4 Environmental Living.

(3) Development consent may be granted to development for a purpose specified in the table to this clause on land in a zone listed beside the purpose, if the area of the lot is equal to or greater than the area specified in the table.

Column 1	Column 2	Column 3
Animal boarding or training establishments	Zone E3 Environmental Management	5 hectares
Educational establishments	Zone E3 Environmental Management or Zone E4 Environmental Living	10 hectares
Places of public worship	Zone E3 Environmental Management	10 hectares

4.2 Rural subdivision

(1) The objective of this clause is to provide flexibility in the application of standards for subdivision in rural zones to allow land owners a greater chance to achieve the objectives for development in the relevant zone.

(2) This clause applies to the following rural zones:

(a) Zone RU1 Primary Production,

(b) Zone RU2 Rural Landscape,

(c) Zone RU4 Primary Production Small Lots,

(d) Zone RU6 Transition.

Note. When this Plan was made it did not include all of these zones.

(3) Land in a zone to which this clause applies may, with development consent, be subdivided for the purpose of primary production to create a lot of a size that is less than the minimum size shown on the Lot Size Map in relation to that land.

(4) However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot.

(5) A dwelling cannot be erected on such a lot.

Note. A dwelling includes a rural worker's dwelling (see definition of that term in the Dictionary).

4.2A Erection of dwelling houses or dual occupancies (attached) on land in certain rural and environment protection zones

(1) The objectives of this clause are as follows:

(a) to enable the replacement of lawfully erected dwelling houses and dual occupancies (attached), and the realisation of dwelling entitlements in rural and environment protection zones,

(b) to restrict the extent of residential development in rural and environment protection zones to maintain the existing character,

(c) to recognise the contribution that development density in these zones makes to the landscape and environmental character of those places.

(2) This clause applies to land in the following zones:

(a) Zone RU2 Rural Landscape,

(b) Zone E3 Environmental Management,

(c) Zone E4 Environmental Living.

(3) Development consent must not be granted for the erection of a dwelling house or a dual occupancy (attached) on land to which this clause applies unless the land:

(a) is a lot that has at least the minimum lot size shown on the Lot Size Map in relation to that land, or

(b) is a lot created under this Plan (other than clause 4.2 (3)), or

(c) is a lot created under an environmental planning instrument before this Plan commenced and on which the erection of a dwelling house or a dual occupancy (attached) was permissible immediately before that commencement, or

(d) is a lot resulting from a subdivision for which development consent (or its equivalent) was granted before this Plan commenced and on which the erection of a dwelling house or a dual occupancy (attached) would have been permissible if the plan of subdivision had been registered before that commencement, or

(e) is an existing holding, or

(f) would have been a lot or holding referred to in paragraph (a), (b), (c), (d) or (e) had it not been affected by:

(i) a minor realignment of its boundaries that did not create an additional lot, or

(ii) a subdivision creating or widening a public road or public reserve or for another public purpose, or

(iii) a consolidation with an adjoining public road or public reserve or for another public purpose.

Note. A dwelling cannot be erected on a lot created under clause 9 of *State Environmental Planning Policy (Rural Lands) 2008* or clause 4.2.

(4) Development consent must not be granted under subclause (3) unless:

(a) no dwelling house or dual occupancy (attached) has been erected on the land, and

(b) if a development application has been made for development for the purposes of a dwelling house or dual occupancy (attached) on the land—the application has been refused or it was withdrawn before it was determined, and

(c) if development consent has been granted in relation to such an application—the consent has been surrendered or it has lapsed.

(5) Development consent may be granted for the erection of a dwelling house or a dual occupancy (attached) on land to which this clause applies if there is a lawfully erected dwelling house or dual occupancy (attached) on the land and the dwelling house or dual occupancy (attached) proposed to be erected is intended only to replace the existing dwelling house or dual occupancy (attached).

(6) Development consent may be granted to convert a dwelling house into, or to replace a dwelling house with, a dual occupancy (attached) on land to which this clause applies if no dual occupancy (attached) exists on the land and the dual occupancy (attached) is designed and will be constructed to have the appearance of a single dwelling.

(7) In this clause:

existing holding means land that:

(a) was a holding on the relevant date, and

(b) is a holding at the time the application for development consent referred to in subclause (3) is lodged,

whether or not there has been a change in the ownership of the holding since the relevant date, and includes any other land adjoining that land acquired by the owner since the relevant date.

holding means all adjoining land, even if separated by a road or railway, held by the same person or persons.

relevant date means:

(a) in the case of land to which *Campbelltown (Urban Area) Local Environmental Plan 2002* applied immediately before the commencement of this Plan:

(i) for land identified as “25 February 1977” on the Former LEP and IDO Boundaries Map—25 February 1977, or

(ii) for land identified as “15 July 1977” on the Former LEP and IDO Boundaries Map—15 July 1977, or

(iii) for land identified as “3 November 1978” on the Former LEP and IDO Boundaries Map—3 November 1978, or

(b) in the case of land to which *Campbelltown Local Environmental Plan—District 8 (Central Hills Lands)* applied immediately before the commencement of this Plan—20 September 1974, or

(c) in the case of land to which *Campbelltown Local Environmental Plan No 1* applied immediately before the commencement of this Plan—26 June 1981, or

(d) in the case of land to which *Interim Development Order No 13—City of Campbelltown* applied immediately before the commencement of this Plan—20 September 1974, or

(e) in the case of land to which *Interim Development Order No 15—City of Campbelltown* applied immediately before the commencement of this Plan—27 September 1974, or

(f) in the case of land to which *Interim Development Order No 28—City of Campbelltown* applied immediately before the commencement of this Plan—3 November 1978.

Note. The owner in whose ownership all the land is at the time the application is lodged need not be the same person as the owner in whose ownership all the land was on the stated date.

4.2B Erection of rural workers' dwellings on land in Zones RU2 and E3

(1) The objectives of this clause are as follows:

(a) to facilitate, on the same land, the provision of adequate accommodation for employees involved in existing agricultural activities, including agricultural produce industries,

(b) to maintain the non-urban landscape and development characters of certain rural and environment protection zones.

(2) This clause applies to land in the following zones:

(a) Zone RU2 Rural Landscape,

(b) Zone E3 Environmental Management.

(3) Development consent must not be granted for the erection of a rural worker's dwelling on land to which this clause applies unless the consent authority is satisfied that:

(a) the development will be on the same lot as an existing lawfully erected dwelling house or dual occupancy (attached), and

(b) the development will not impair the use of the land for agricultural activities, including agricultural produce industries, and

(c) the agricultural activity or agricultural produce industry has an economic capacity to support the ongoing employment of rural workers, and

(d) the development is necessary considering the nature of the existing or proposed agricultural activity or agricultural produce industry occurring on the land or as a result of the remote or isolated location of the land, and

(e) there will be not more than one rural worker's dwelling on the lot, and

(f) the development will be a single storey building with a maximum floor area of 120 square metres or not more than 20% of the floor area of any existing dwelling house on that land, whichever is greater.

4.2C Exceptions to minimum subdivision lot sizes for certain land in Zones RU2 and E3

(1) The objective of this clause is to allow the owners of certain land to which the following environmental planning instruments applied to excise a home-site area from an existing lot (or existing holding) by the means of a subdivision:

(a) *Campbelltown Local Environmental Plan No 1*,

(b) *Interim Development Order No 15—City of Campbelltown*.

(2) Subclause (3) applies to each lot to which *Campbelltown Local Environmental Plan No 1* applied immediately before its repeal that:

(a) was in existence on 26 June 1981, and

(b) is in Zone E3 Environmental Management, and

(c) has an area of at least 10 hectares.

(3) Development consent must not be granted to the subdivision of the land to which this subclause applies unless the proposed subdivision will result in the

creation of only 2 lots, each of which must have an area of at least 2 hectares.

(4) Subclause (5) applies to each lot to which *Interim Development Order No 15—City of Campbelltown* applied immediately before its repeal that:

(a) was in existence on 18 July 1973, and

(b) is in Zone RU2 Rural Landscape.

(5) Development consent must not be granted to the subdivision of the land to which this subclause applies unless the smallest lot to be created has an area of at least 2 hectares and is required for the erection of a dwelling house for occupation by:

(a) the person who owned the land on 18 July 1973, or

(b) a relative of that owner, or

(c) a person employed or engaged by that owner in the use of land of the owner adjoining or adjacent to that lot for the purpose of agriculture.

(6) The total number of lots that may be created by the subdivision of land to which subclause (5) applies, whether by one or more subdivisions, must not exceed:

(a) if the land to be subdivided had an area of less than 10 hectares—nil, or

(b) if the land to be subdivided had an area of at least 10 hectares but less than 40 hectares—1, or

(c) if the land to be subdivided had an area of at least 40 hectares but less than 80 hectares—2, or

(d) if the land to be subdivided had an area of at least 80 hectares—3.

4.2D Exceptions to minimum subdivision lot sizes for certain land in Zone E4

(1) The objective of this clause is to permit the subdivision of certain land in the East Edge Scenic Protection Lands Area to create lots of a size that are less than the minimum lot size shown on the Lot Size Map in relation to that land.

(2) This clause applies to land identified as “1 ha” on the Lot Averaging Map.

(3) Despite clause 4.1, development consent may be granted to the subdivision of land to which this clause applies if the subdivision will not create a number of lots that is more than the number resulting from multiplying the total area of the land being subdivided by the maximum density control number specified on the Lot Averaging Map in relation to that land.

(4) Development consent must not be granted under this clause unless the consent authority is satisfied that:

(a) the pattern of lots created by the subdivision, the provision of access and services and the location of any future buildings on the land will not have a significant detrimental impact on native vegetation, and

(b) each lot to be created by the subdivision contains a suitable land area for:

(i) a dwelling house, and

(ii) an appropriate asset protection zone relating to bush fire hazard, and

(iii) if reticulated sewerage is not available to the lot—on-site sewage treatment, management and disposal, and

(iv) other services related to the use of the land for residential occupation, and

(c) if reticulated sewerage is not available to the lot—a geotechnical assessment demonstrates to the consent authority's satisfaction that the lot can suitably accommodate the on-site treatment, management and disposal of effluent, and

(d) adequate arrangements are in place for the provision of infrastructure to service the needs of development in the locality.

NOTE: A copy of the complete written instrument for the Campbelltown Local Environmental Plan 2015 is available on the NSW Legislation website at: http://www.legislation.nsw.gov.au

SafeWork NSW Records

NSW GOVERNMENT | SafeWork NSW

Locked Bag 2906, Lisarow NSW 2252
Customer Experience 13 10 50
ABN 81 913 830 179 | www.safework.nsw.gov.au

Our Ref: D20/177901

11 September 2020

Mr Harry Leonard
JK Environments
hleonard@jkenvironments.com.au

Dear Mr Leonard

RE SITE: Lot 1 DP883417 Camden Rd, Campbelltown NSW 2560

I refer to your site search request received by SafeWork NSW on 28 August 2020 requesting information on Storage of Hazardous Chemicals for the above site.

A search of the records held by SafeWork NSW has not located any records pertaining to the above-mentioned premises.

For further information or if you have any questions, please call us on 13 10 50 or email licensing@safework.nsw.gov.auw

Yours sincerely

Gabriela Draper

Customer Service Officer
Customer Experience - Operations
SafeWork NSW

Appendix C: Laboratory Results Summary Tables

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

ABC:	Ambient Background Concentration
ACM:	Asbestos Containing Material
AF:	Asbestos Fines
ANZG	Australian and New Zealand Guidelines
B(a)P:	Benzo(a)pyrene
CEC:	Cation Exchange Capacity
CRC:	Cooperative Research Centre
CT:	Contaminant Threshold
EILs:	Ecological Investigation Levels
ESLs:	Ecological Screening Levels
FA:	Fibrous Asbestos
GSW:	General Solid Waste
HILs:	Health Investigation Levels
HSLs:	Health Screening Levels
kg/L	kilograms per litre
NA:	Not Analysed
NC:	Not Calculated
NEPM:	National Environmental Protection Measure
NHMRC:	National Health and Medical Research Council
NL:	Not Limiting
NSL:	No Set Limit
OCP:	Organochlorine Pesticides
OPP:	Organophosphorus Pesticides
PAHs:	Polycyclic Aromatic Hydrocarbons
%w/w:	weight per weight
ppm:	Parts per million
PCBs:	Polychlorinated Biphenyls
PCE:	Perchloroethylene (Tetrachloroethylene or Teterachloroethene)
PQL:	Practical Quantitation Limit
RS:	Rinsate Sample
RSL:	Regional Screening Levels
RSW:	Restricted Solid Waste
SAC:	Site Assessment Criteria
SCC:	Specific Contaminant Concentration
SSA:	Site Specific Assessment
SSHSLs:	Site Specific Health Screening Levels
TB:	Trip Blank
TCA:	1,1,1 Trichloroethane (methyl chloroform)
TCE:	Trichloroethylene (Trichloroethene)
TCLP:	Toxicity Characteristics Leaching Procedure
TS:	Trip Spike
TRH:	Total Recoverable Hydrocarbons
UCL:	Upper Level Confidence Limit on Mean Value
USEPA	United States Environmental Protection Agency
VOCC:	Volatile Organic Chlorinated Compounds
WHO:	World Health Organisation

Table Specific Explanations:

HIL Tables:

- The chromium results are for Total Chromium which includes Chromium III and VI. For initial screening purposes, we have assumed that the samples contain only Chromium VI unless demonstrated otherwise by additional analysis.
- Carcinogenic PAHs is a toxicity weighted sum of analyte concentrations for a specific list of PAH compounds relative to B(a)P. It is also refered to as the B(a)P Toxic Equivalence Quotient (TEQ).
- Statistical calculations are undertaken using ProUCL (USEPA). Statistical calculation is usually undertaken using data from fill samples.

EIL/ESL Table:

- ABC Values for selected metals have been adopted from the published background concentrations presented in Olszowy et. al., (1995), Trace Element Concentrations in Soils from Rural and Urban New South Wales (the 25th percentile values for old suburbs with high traffic have been quoted).

Waste Classification and TCLP Table:

- Data assessed using the NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste (2014).
- The assessment of Total Moderately Harmful pesticides includes: Dichlorovos, Dimethoate, Fenitrothion, Ethion, Malathion and Parathion.
- Assessment of Total Scheduled pesticides include: HBC, alpha-BHC, gamma-BHC, beta-BHC, Heptachlor, Aldrin, Heptachlor Epoxide, gamma-Chlordane, alpha-chlordane, pp-DDE, Dieldrin, Endrin, pp-DDD, pp-DDT, Endrin Aldehyde.

QA/QC Table:

- Field blank, Inter and Intra laboratory duplicate results are reported in mg/kg.
- Trip spike results are reported as percentage recovery.
- Field rinsate results are reported in µg/L.

TABLE S1
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013.
HIL-C: 'Public open space; secondary schools; and footpaths'

All data in mg/kg unless stated otherwise			HEAVY METALS								PAHs		ORGANOCHLORINE PESTICIDES (OCPs)							OP PESTICIDES (OPPs)	TOTAL PCBs	ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium VI	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	Carcinogenic PAHs	HCB	Endosulfan	Methoxychlor	Aldrin & Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor	Chlorpyrifos		
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	100
Site Assessment Criteria (SAC)			300	90	300	17000	600	80	1200	30000	300	3	10	340	400	10	70	400	10	250	1	Detected/Not Detected
Sample Reference	**Sample Depth**	**Sample Description**																				
BH1	0.1-0.2	Fill: Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH2	0-0.2	Fill: Silty clay	**6**	<0.4	**13**	**40**	**93**	**0.3**	**19**	**120**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH2 (Lab duplicate)	0-0.2	Fill: Silty clay	**7**	<0.4	**12**	**42**	**110**	**0.4**	**16**	**170**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH3	0-0.2	Fill: Silty clay	**8**	<0.4	**15**	**31**	**60**	<0.1	**10**	**73**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH4	0.1-0.2	Fill: Silty clay	**17**	<0.4	**15**	**35**	**120**	**0.2**	**12**	**170**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH7	0.1-0.2	Fill: Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
BH8	0-0.2	Fill: Silty clay	**8**	<0.4	**18**	**19**	**37**	<0.1	**6**	**34**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH9	0-0.2	Fill: Silty clay	**8**	<0.4	**18**	**17**	**61**	<0.1	**8**	**41**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH10	0.1-0.2	Fill: Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
SDUP1	-	Fill: Silty clay	**7**	<0.4	**14**	**50**	**160**	**0.5**	**20**	**180**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH2-F1	0-0.5	Material (FCF)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
Total Number of Samples			7	7	7	7	7	7	7	7	6	6	4	4	4	4	4	4	4	4	4	9
Maximum Value			17	<PQL	18	50	160	0.5	20	180	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	Detected

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

TABLE S2
SOIL LABORATORY RESULTS COMPARED TO HSLs
All data in mg/kg unless stated otherwise

					C_6-C_{10} (F1)	$>C_{10}$-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	Field PID Measurement
PQL - Envirolab Services					25	50	0.2	0.5	1	1	1	ppm
NEPM 2013 HSL Land Use Category					HSL-D: COMMERCIAL/INDUSTRIAL							
Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**								
BH2	0-0.2	Fill: Silty clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH2 (Lab duplicate)	0-0.2	Fill: Silty clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH3	0-0.2	Fill: Silty clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0.2
BH4	0.1-0.2	Fill: Silty clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0.1
BH8	0-0.2	Fill: Silty clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	7.2
BH9	0-0.2	Fill: Silty clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0.1
SDUP1	-	Fill: Silty clay	0m to <1m	Clay	NA	NA	NA	NA	NA	NA	NA	-
Total Number of Samples					6	6	6	6	6	6	6	6
Maximum Value					<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	7.2

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**
The guideline corresponding to the concentration above the SAC is highlighted in grey in the Site Assessment Criteria Table below

HSL SOIL ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**	C_6-C_{10} (F1)	$>C_{10}$-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
BH2	0-0.2	Fill: Silty clay	0m to <1m	Clay	310	NL	4	NL	NL	NL	NL
BH2 (Lab duplicate)	0-0.2	Fill: Silty clay	0m to <1m	Clay	310	NL	4	NL	NL	NL	NL
BH3	0-0.2	Fill: Silty clay	0m to <1m	Clay	310	NL	4	NL	NL	NL	NL
BH4	0.1-0.2	Fill: Silty clay	0m to <1m	Clay	310	NL	4	NL	NL	NL	NL
BH8	0-0.2	Fill: Silty clay	0m to <1m	Clay	310	NL	4	NL	NL	NL	NL
BH9	0-0.2	Fill: Silty clay	0m to <1m	Clay	310	NL	4	NL	NL	NL	NL
SDUP1	-	Fill: Silty clay	0m to <1m	Clay	NA	NA	NA	NA	NA	NA	NA

TABLE S3
SOIL LABORATORY RESULTS COMPARED TO MANAGEMENT LIMITS
All data in mg/kg unless stated otherwise

			C_6-C_{10} (F1) plus BTEX	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)
PQL - Envirolab Services			25	50	100	100
NEPM 2013 Land Use Category			**COMMERCIAL/INDUSTRIAL**			
Sample Reference	**Sample Depth**	**Soil Texture**				
BH2	0-0.2	Fine	<25	<50	<100	<100
BH2 (Lab duplicate)	0-0.2	Fine	<25	<50	<100	<100
BH3	0-0.2	Fine	<25	<50	<100	<100
BH4	0.1-0.2	Fine	<25	<50	<100	<100
BH8	0-0.2	Fine	<25	<50	<100	<100
BH9	0-0.2	Fine	<25	<50	<100	<100
SDUP1	-	Fine	NA	NA	NA	NA
Total Number of Samples			6	6	6	6
Maximum Value			<PQL	<PQL	<PQL	<PQL

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

MANAGEMENT LIMIT ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Soil Texture**	C_6-C_{10} (F1) plus BTEX	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)
BH2	0-0.2	Fine	800	1000	5000	10000
BH2 (Lab duplicate)	0-0.2	Fine	800	1000	5000	10000
BH3	0-0.2	Fine	800	1000	5000	10000
BH4	0.1-0.2	Fine	800	1000	5000	10000
BH8	0-0.2	Fine	800	1000	5000	10000
BH9	0-0.2	Fine	800	1000	5000	10000
SDUP1	-	Fine	--	--	--	--

TABLE S4
SOIL LABORATORY RESULTS COMPARED T0 DIRECT CONTACT CRITERIA
All data in mg/kg unless stated otherwise

Analyte		C_6-C_{10}	>C_{10}-C_{16}	>C_{16}-C_{34}	>C_{34}-C_{40}	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	PID
PQL - Envirolab Services		25	50	100	100	0.2	0.5	1	1	1	
CRC 2011 -Direct contact Criteria		26,000	20,000	27,000	38,000	430	99,000	27,000	81,000	11,000	
Site Use		**COMMERCIAL/INDUSTRIAL - DIRECT SOIL CONTACT**									
Sample Reference	**Sample Depth**										
BH2	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH2 (Lab duplicate)	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH3	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	**0.2**
BH4	0.1-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	**0.1**
BH8	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	**7.2**
BH9	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	**0.1**
SDUP1	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	-
Total Number of Samples		6	6	6	6	6	6	6	6	6	6
Maximum Value		<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	7.2

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

TABLE S5
ASBESTOS QUANTIFICATION - FIELD OBSERVATIONS AND LABORATORY RESULTS
HSL-C: Public Open Space; secondary schools; and footpaths

HSL -C:Public open space; secondary schools; and footpaths

FIELD DATA															LABORATORY DATA (QUANTIFICATION)												
Date Sampled	Sample reference	Sample Depth	Visible ACM in top 100mm	Approx. Volume of Soil (L)	Soil Mass (g)	Mass ACM (g)	Mass Asbestos in ACM (g)	[Asbestos from ACM in soil] (%w/w)	Mass ACM <7mm (g)	Mass Asbestos in ACM <7mm (g)	[Asbestos from ACM <7mm in soil] (%w/w)	Mass FA (g)	Mass Asbestos in FA (g)	[Asbestos from FA in soil] (%w/w)	Lab Report Number	Sample refeference	Sample Depth	Sample Mass (g)	Asbestos ID in soil (AS4964) >0.1g/kg	Trace Analysis	Total Asbestos (g/kg)	Asbestos ID in soil <0.1g/kg	ACM >7mm Estimation (g)	FA and AF Estimation (g)	ACM >7mm Estimation %(w/w)	FA and AF Estimation %(w/w)
SAC			**No**					**0.02**			**0.001**			**0.001**											**0.02**	**0.001**
25/08/2020	BH2	0-0.5	No	10	10,002	10.6	1.596	0.0160	No ACM <7mm observed	--	--	No FA observed	--	--	249821	BH2	0-0.2	733.18	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
25/08/2020	BH3	0-0.4	No	10	10,640	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
25/08/2020	BH8	0-0.4	No	10	9,680	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Concentration above the SAC **VALUE**

TABLE S6
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013 EILs AND ESLs
All data in mg/kg unless stated otherwise

Land Use Category				COMMERCIAL/INDUSTRIAL																	
							AGED HEAVY METALS-EILs						EILs		ESLs							
				pH	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
PQL - Envirolab Services				-	1	-	4	1	1	1	1	1	1	0.1	25	50	100	100	0.2	0.5	1	1	0.05
Ambient Background Concentration (ABC)				-	-	-	NSL	13	28	163	5	122	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL
Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**																			
BH2	0-0.2	Fill: Silty clay	Fine	NA	NA	NA	**6**	**13**	**40**	**93**	**19**	**120**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH2 (Lab duplicate)	0-0.2	Fill: Silty clay	Fine	NA	NA	NA	**7**	**12**	**42**	**110**	**16**	**170**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH3	0-0.2	Fill: Silty clay	Fine	NA	NA	NA	**8**	**15**	**31**	**60**	**10**	**73**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH4	0.1-0.2	Fill: Silty clay	Fine	NA	NA	NA	**17**	**15**	**35**	**120**	**12**	**170**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH8	0-0.2	Fill: Silty clay	Fine	NA	NA	NA	**8**	**18**	**19**	**37**	**6**	**34**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH9	0-0.2	Fill: Silty clay	Fine	NA	NA	NA	**8**	**18**	**17**	**61**	**8**	**41**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
SDUP1	-	Fill: Silty clay	Fine	NA	NA	NA	**7**	**14**	**50**	**160**	**20**	**180**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Number of Samples				0	0	0	7	7	7	7	7	7	6	4	6	6	6	6	6	6	6	6	6
Maximum Value				NA	NA	NA	17	18	50	160	20	180	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**
The guideline corresponding to the elevated value is highlighted in grey in the EIL and ESL Assessment Criteria Table below

EIL AND ESL ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**	pH	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
BH2	0-0.2	Fill: Silty clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	2500	6600	95	135	185	95	72
BH2 (Lab duplicate)	0-0.2	Fill: Silty clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	2500	6600	95	135	185	95	72
BH3	0-0.2	Fill: Silty clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	2500	6600	95	135	185	95	72
BH4	0.1-0.2	Fill: Silty clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	2500	6600	95	135	185	95	72
BH8	0-0.2	Fill: Silty clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	2500	6600	95	135	185	95	72
BH9	0-0.2	Fill: Silty clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	2500	6600	95	135	185	95	72
SDUP1	-	Fill: Silty clay	Fine	NA	NA	NA	160	320	110	2000	60	230	--	--	--	--	--	--	--	--	--	--	--

TABLE S7
SOIL LABORATORY RESULTS COMPARED TO WASTE CLASSIFICATION GUIDELINES
All data in mg/kg unless stated otherwise

			HEAVY METALS								PAHs		OC/OP PESTICIDES				Total	TRH					BTEX COMPOUNDS				ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	B(a)P	Total Endosulfans	Chloropyrifos	Total Moderately Harmful	Total Scheduled	PCBs	C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}	Total C_{10}-C_{36}	Benzene	Toluene	Ethyl benzene	Total Xylenes	
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.05	0.1	0.1	0.1	0.1	0.1	25	50	100	100	50	0.2	0.5	1	1	100
General Solid Waste CT1			100	20	100	NSL	100	4	40	NSL	200	0.8	60	4	250	50	50	650		NSL		10,000	10	288	600	1,000	-
General Solid Waste SCC1			500	100	1900	NSL	1500	50	1050	NSL	200	10	108	7.5	250	50	50	650		NSL		10,000	18	518	1,080	1,800	-
Restricted Solid Waste CT2			400	80	400	NSL	400	16	160	NSL	800	3.2	240	16	1000	50	50	2600		NSL		40,000	40	1,152	2,400	4,000	-
Restricted Solid Waste SCC2			2000	400	7600	NSL	6000	200	4200	NSL	800	23	432	30	1000	50	50	2600		NSL		40,000	72	2,073	4,320	7,200	-
Sample Reference	**Sample Depth**	**Sample Description**																									
BH1	0.1-0.2	Fill: Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH2	0-0.2	Fill: Silty clay	**6**	<0.4	**13**	**40**	**93**	**0.3**	**19**	**120**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH2 (Lab duplicate)	0-0.2	Fill: Silty clay	**7**	<0.4	**12**	**42**	**110**	**0.4**	**16**	**170**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
BH3	0-0.2	Fill: Silty clay	**8**	<0.4	**15**	**31**	**60**	<0.1	**10**	**73**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH4	0.1-0.2	Fill: Silty clay	**17**	<0.4	**15**	**35**	**120**	**0.2**	**12**	**170**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH7	0.1-0.2	Fill: Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
BH8	0-0.2	Fill: Silty clay	**8**	<0.4	**18**	**19**	**37**	<0.1	**6**	**34**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH9	0-0.2	Fill: Silty clay	**8**	<0.4	**18**	**17**	**61**	<0.1	**8**	**41**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH10	0.1-0.2	Fill: Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
SDUP1	-	Fill: Silty clay	**7**	<0.4	**14**	**50**	**160**	**0.5**	**20**	**180**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH2-F1	0-0.2	Material (FCF)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
Total Number of Samples			7	7	7	7	7	7	7	7	6	6	4	4	4	4	4	6	6	6	6	6	6	6	6	6	9
Maximum Value			17	<PQL	18	50	160	0.5	20	180	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	Detected

Concentration above the CT1 — **VALUE**
Concentration above SCC1 — **VALUE**
Concentration above the SCC2 — **VALUE**
Concentration above PQL — **Bold**

TABLE S8
SOIL LABORATORY TCLP RESULTS
All data in mg/L unless stated otherwise

			Lead
PQL - Envirolab Services			0.03
TCLP1 - General Solid Waste			5
TCLP2 - Restricted Solid Waste			20
TCLP3 - Hazardous Waste			>20
Sample Reference	**Sample Depth**	**Sample Description**	
BH2	0-0.2	Fill: Silty clay	<0.03
BH2 (Lab duplicate)	0-0.2	Fill: Silty clay	<0.03
BH4	0.1-0.2	Fill: Silty clay	<0.03
SDUP1	-	Fill: Silty clay	<0.03
Total Number of samples			4
Maximum Value			<PQL

General Solid Waste	**VALUE**
Restricted Solid Waste	**VALUE**
Hazardous Waste	**VALUE**
Concentration above PQL	**Bold**

TABLE Q1
SOIL QA/QC SUMMARY

			TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
	PQL Envirolab SYD		*25*	*50*	*100*	*100*	*0.2*	*0.5*	*1*	*2*	*1*	*4*	*0.4*	*1*	*1*	*1*	*0.1*	*1*	*1*
	PQL Envirolab VIC		*25*	*50*	*100*	*100*	*0.2*	*0.5*	*1.0*	*2.0*	*1.0*	*4.0*	*0.4*	*1.0*	*1.0*	*1.0*	*0.1*	*1.0*	*1.0*
Intra	BH8	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	8	<0.4	18	19	37	<0.1	6	34
laboratory	SDUP1	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	7	<0.4	14	50	160	0.5	20	180
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	7.5	nc	16	34.5	98.5	0.275	13	107
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	13%	nc	25%	90%	125%	164%	108%	136%
Trip	TS-S1		-	-	-	-	120%	124%	124%	122%	122%	-	-	-	-	-	-	-	-
Spike	25/08/20																		

Result outside of QA/QC acceptance criteria

Appendix D: Borehole Logs

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BOREHOLE LOG

Borehole No. 1

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMBELLTOWN, NSW

Job No.: 33438A **Method:** SPIRAL AUGER **R.L. Surface:** 67.85 m

Date: 25/8/20 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** K.K.S/A.J.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING										FILL: Silty clay, medium plasticity, brown, trace of root fibres and fine grained igneous gravel.	w<PL			GRASS COVER
					N = 11 4,6,5	67	1		CH	Silty CLAY: high plasticity, orange brown mottled yellow, trace of fine grained ironstone gravel, root fibres and ash.	w<PL	VSt	330 350 360	ALLUVIAL
					N = 19 6,10,9	66	2					Hd	480 520 550	
					N = 14 5,6,8	65	3			Silty CLAY: high plasticity, brown mottled grey, trace of fine grained ironstone gravel.			590 550 >600	
ON COMPLETION OF CORING AND AFTER 3 HRS						64	4			as above, but orange brown mottled grey.				
					N = 14 5,6,8	63	5						500 470 580	
					N > 10 8,10/ 100mm REFUSAL	62	6		-	Extremely Weathered siltstone: Silty CLAY, medium plasticity, orange brown and grey, trace fine to medium grained ironstone gravel.	XW	Hd	>600 >600 >600	ASHFIELD SHALE
						61				SILTSTONE: grey, with extremely weathered bands.	MW	L - M		LOW TO MODERATE 'TC' BIT RESISTANCE WITH VERY LOW BANDS

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BOREHOLE LOG

Borehole No. 1

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMBELLTOWN, NSW

Job No.: 33438A **Method:** SPIRAL AUGER **R.L. Surface:** 67.85 m

Date: 25/8/20 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** K.K.S/A.J.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
									-	SILTSTONE: grey, with extremely weathered bands. *(continued)*	MW	L - M		
										REFER TO CORED BOREHOLE LOG				
						60	8							
						59	9							
						58	10							
						57	11							
						56	12							
						55	13							
						54								

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CORED BOREHOLE LOG

Borehole No. 1 **3 / 3**

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMBELLTOWN, NSW

Job No.: 33438A **Core Size:** NMLC **R.L. Surface:** 67.85 m

Date: 25/8/20 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** K.K.S/A.J.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS SPACING (mm)	DEFECT DETAILS DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
					START CORING AT 7.25m						
90% RETURN		60	8		SILTSTONE: grey and brown, bedded at 0-10°.	MW	L - M	0.20		(7.25m) XWS, 0°, 55 mm.t (7.36m) XWS, 0°, 20 mm.t (7.38m) CS, 0°, 35 mm.t (7.42m) XWS, 0°, 60 mm.t (7.48-7.57m) J, 60°, P, R, Cn (7.57m) XWS, 0°, 40 mm.t (7.65m) XWS, 0°, 15 mm.t (7.74m) J, 28°, Un, R, Cn (7.86m) XWS, 0°, 40 mm.t (7.93m) Be, 0°, Un, R, Cn	Ashfield Shale
					as above, but dark grey with occasional iron indurated bands.	SW	M	0.30			
		59	9		SILTSTONE: dark grey, bedded at 0-10°.	FR		0.60 0.50 0.40		(8.12m) J, 35°, C, R, Cn (8.17m) J, 90°, Un, R, Cn (8.26m) J, 35°, C, R, Fe Sn (8.31m) CS, 0°, 55 mm.t (8.38m) Be, 0°, Un, R, Fe Sn (8.44m) XWS, 0°, 10 mm.t (8.78m) Be, 0°, Un, R, Cn (8.81m) XWS, 0°, 10 mm.t (8.82-9.00m) J, 80 - 90°, Un, R, Cn (9.09m) XWS, 0°, 5 mm.t	
		58	10			SW - FR	L - M	0.30 0.20		(9.53-9.75m) J, 80 - 50°, Un, R, Cn	
					END OF BOREHOLE AT 10.15 m						
		57	11								
		56	12								
		55	13								
		54									

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

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BOREHOLE LOG

Borehole No. 2

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMBELLTOWN, NSW

Job No.: 33438A **Method:** SPIRAL AUGER **R.L. Surface:** 67.60 m

Date: 24/8/20 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** K.K.S/A.J.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										FILL: Silty clay, medium plasticity, dark grey and brown, trace of root fibres, fine grained sand and asbestos fragments.	w~PL			GRASS COVER SCREEN: 0-0.5m 10.02kg F1 at 0-0.5m
					N = 9 4,4,5	67	1		CH	Silty CLAY: high plasticity, orange brown mottled yellow, trace of fine grained ironstone gravel.	w<PL	VSt	350 390 360	ALLUVIAL
					N = 13 5,6,7	66	2			as above, but trace of fine grained sand and ash.			310 370 360	
					N = 27 8,12,15	65	3			Silty CLAY: high plasticity, orange brown mottled yellow and grey, trace of fine to medium grained ironstone gravel, fine grained sand and ash.		Hd	>600 >600 >600	
					N = 29 8,14,15	64 63	4 5			as above, but without fine grained sand.			420 >600 580	
▽ AFTER 3.75HRS					N = 24 5,10,14	62	6			SILTSTONE: grey.	MW	L L - M		ASHFIELD SHALE LOW 'TC' BIT RESISTANCE WITH VERY LOW BANDS
						61								

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BOREHOLE LOG

Borehole No. 2 **2 / 2**

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMBELLTOWN, NSW

Job No.: 33438A **Method:** SPIRAL AUGER **R.L. Surface:** 67.60 m

Date: 24/8/20 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** K.K.S/A.J.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
										SILTSTONE: grey. *(continued)*	MW	L - M		LOW TO MODERATE RESISTANCE
				■		60	8				SW - FR	H		HIGH RESISTANCE
						59	9							
										END OF BOREHOLE AT 9.20 m				'TC' BIT REFUSAL
						58	10							
						57	11							
						56	12							
						55	13							
						54								

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BOREHOLE LOG

Borehole No. 3
1 / 2

Client: ERILYAN
Project: PROPOSED GENESISCARE CAMPBELLTOWN
Location: CNR KELLICAR & CAMDEN ROADS, CAMBELLTOWN, NSW

Job No.: 33438A **Method:** SPIRAL AUGER **R.L. Surface:** 68.23 m
Date: 24/8/20 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** K.K.S/A.J.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						68				FILL: Silty clay, medium plasticity, brown, trace of root fibres.				GRASS COVER SCREEN: 0-0.4m 10.64kg NO FCF
					N = 9 5,4,5				CH	Silty CLAY: high plasticity, orange brown mottled yellow, trace of fine grained ironstone gravel and root fibres.	w<PL	VSt	330 350 380	ALLUVIAL
						67	1			as above, but without root fibres.				
					N = 17 3,8,9							Hd	510 540 >600	
					N = 20 7,8,12	66	2							
						65	3			Silty CLAY: high plasticity, orange brown mottled yellow and grey, trace of fine grained ironstone gravel.			>600 >600 >600	
AFTER 2 HRS					N = 17 5,7,10	64	4						>600 >600 540	
						63	5							
					N = 15 5,6,9	62	6						420 440 440	
										SILTSTONE: grey.	SW	M		ASHFIELD SHALE

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BOREHOLE LOG

Borehole No. 3 **2 / 2**

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMBELLTOWN, NSW

Job No.: 33438A **Method:** SPIRAL AUGER **R.L. Surface:** 68.23 m

Date: 24/8/20 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** K.K.S/A.J.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
						61	8			SILTSTONE: grey. *(continued)*	SW	M		ASHFIELD SHALE LOW TO MODERATE 'TC' BIT RESISTANCE
											SW - FR	M - H		MODERATE TO HIGH RESISTANCE
						60								
							9					H		HIGH RESISTANCE
						59								
							10			END OF BOREHOLE AT 10.00 m				
						58								
							11							
						57								
							12							
						56								
							13							
						55								

JK 9.02.4 LIB GLB Log JK AUGERHOLE - MASTER 33438A CAMPBELLTOWN.GPJ <<DrawingFile>> 18/09/2020 15:53 10.01.00.01 Datgel Lab and In Situ Tool - DGD | Lib: JK 9.02.4 2019-05-31 Prj: JK 9.01.0 2018-03-20

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BOREHOLE LOG

Borehole No. 4

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMBELLTOWN, NSW

Job No.: 33438A **Method:** SPIRAL AUGER **R.L. Surface:** 68.07 m

Date: 25/8/20 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** K.K.S/A.J.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING						68				FILL: Silty clay, medium plasticity, brown, trace of root fibres, fine grained igneous and ironstone gravel.	w<PL			GRASS COVER
					N = 9 3,4,5	67	1		CH	Silty CLAY: high plasticity, orange brown mottled grey, trace of root fibres and fine grained ironstone gravel.	w<PL	VSt - Hd	350 480 450	ALLUVIAL
					N = 13 5,6,7	66	2		CL	Sandy CLAY: low plasticity, orange brown, fine grained sand, trace of fine grained ironstone gravel and ash.		Hd	550 460 500	
ON COMPLETION OF CORING					N = 27 10,13,14	65	3		CH	Silty CLAY: high plasticity, orange brown, trace of fine grained ironstone gravel.			450 480	HP READINGS ON DISTURBED AUGER SAMPLE
					N = 13 4,5,8	64	4		CI-CH	Silty CLAY: medium to high plasticity, orange brown mottled grey, trace of fine grained ironstone gravel.	w~PL	VSt	330 350 360	
					N = 22 6,9,13	63	5							
						62	6			as above, but trace of fine to medium grained ironstone gravel.			300 280 350	

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BOREHOLE LOG

Borehole No. 4 **2 / 3**

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMBELLTOWN, NSW

Job No.: 33438A **Method:** SPIRAL AUGER **R.L. Surface:** 68.07 m

Date: 25/8/20 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** K.K.S/A.J.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
				■		61				SILTSTONE: grey and brown. *(continued)* REFER TO CORED BOREHOLE LOG	MW	L - M		ASHFIELD SHALE LOW TO MODERATE 'TC' BIT RESISTANCE
						60	8							
						59	9							
						58	10							
						57	11							
						56	12							
						55	13							

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CORED BOREHOLE LOG

Borehole No. 4

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMBELLTOWN, NSW

Job No.: 33438A **Core Size:** NMLC **R.L. Surface:** 68.07 m

Date: 25/8/20 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** K.K.S/A.J.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	SPACING (mm)	DEFECT DETAILS DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
		61			START CORING AT 7.12m						
					SILTSTONE: grey and brown, bedded at 0-10°.	MW	L - M	0.50		(7.18m) XWS, 0°, 100 mm.t (7.33-7.47m) J, 90°, Un, R, Clay FILLED, 2 mm.t (7.47m) XWS, 0°, 20 mm.t (7.52m) CS, 0°, 5 mm.t (7.54-7.62m) Jx 2, 75°, P, R, Clay FILLED, 2 mm.t (7.62m) Cr, 0°, 70 mm.t	Ashfield Shale
					NO CORE 0.31m						
75% RETURN		60	8		SILTSTONE: dark grey, with occasional iron indurated bands, bedded at 0-10°.	SW	M - H	0.50		(8.12m) Be, 0°, Un, R, Cn (8.14m) XWS, 0°, 30 mm.t (8.18m) J, 90°, St, R, Cn (8.21m) XWS, 0°, 100 mm.t (8.36m) CS, 0°, 20 mm.t (8.41m) Be, 0°, P, R, Fe Sn (8.49m) Be, 0°, Un, R, Cn (8.52m) XWS, 0°, 5 mm.t (8.65m) Ji, 30°, Un (8.72m) Be, 0°, Un, R, Cn (8.75m) XWS, 0°, 30 mm.t (8.90m) Be, 0°, P, R, Cn	Ashfield Shale
					as above, but without iron indurated bands.	FR	H	1.1 1.1		(9.09m) XWS, 0°, 5 mm.t (9.18-9.27m) Ji, 90°, Un (9.37m) J, 90°, Un, R, Cn (9.48m) J, 15°, Un, R, Cn	
		59	9				M	0.70		(9.63-9.79m) Jx 2, 80 - 90°, Un, R, Cn	
		58	10					0.60		(9.81-9.95m) J, 80 - 90°, Un, R, Cn	
					END OF BOREHOLE AT 10.12 m						
		57	11								
		56	12								
		55	13								

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

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BOREHOLE LOG

Borehole No. 5

1 / 1

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMBELLTOWN, NSW

Job No.: 33438A **Method:** SPIRAL AUGER **R.L. Surface:** 67.15 m

Date: 24/8/20 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** K.K.S/A.J.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						67				FILL: Sandy gravel, fine to coarse grained, igneous, grey, fine to coarse grained sand.	M w>PL			ROADBASE
					N=0 0,0,0		1			FILL: Silty clay, medium plasticity, orange brown mottled yellow, trace of fine to medium grained sand, fine grained ironstone gravel and ash.			40 40 90	APPEARS POORLY COMPACTED
						66								
					N = 9 4,4,5				CH	Silty CLAY: high plasticity, orange brown mottled yellow, trace of fine to medium grained sand.	w>PL	St - VSt	250 140 220	ALLUVIAL
						65	2			END OF BOREHOLE AT 1.95 m				
						64	3							
						63	4							
						62	5							
						61	6							

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BOREHOLE LOG

Borehole No. 6

1 / 1

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMBELLTOWN, NSW

Job No.: 33438A **Method:** SPIRAL AUGER **R.L. Surface:** 66.99 m

Date: 24/8/20 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** K.K.S/A.J.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										FILL: Sandy gravel, fine to coarse grained, igneous, grey, fine to coarse grained sand.	M			ROADBASE
									CI-CH		w<PL	Hd		ALLUVIAL
					N = 12 4,5,7					Silty CLAY: medium to high plasticity, orange brown mottled yellow, trace of fine grained sand, fine grained ironstone gravel and ash.			460 510 >600	
						66	1							
					N = 20 5,9,11								550 570 580	
						65	2			END OF BOREHOLE AT 1.95 m				
						64	3							
						63	4							
						62	5							
						61	6							

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BOREHOLE LOG

Borehole No. 7

1 / 1

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMBELLTOWN, NSW

Job No.: 33438A **Method:** SPIRAL AUGER **R.L. Surface:** 66.73 m

Date: 24/8/20 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** K.K.S/A.J.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										FILL: Silty clay, medium plasticity, brown, trace of root fibres.	W			GRASS COVER
									CI-CH	Silty CLAY: medium to high plasticity, orange brown, trace of fine grained sand, and fine grained ironstone gravel.	w~PL	VSt - Hd		ALLUVIAL
					N = 10 4,5,5	66	1						350 440 490	
					N = 20 5,8,12	65				as above, but orange brown mottled yellow and grey.		Hd	410 450 430	
						64	2			END OF BOREHOLE AT 1.95 m				
						63	3							
						62	4							
						61	5							
						60	6							

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BOREHOLE LOG

Borehole No. 8

1 / 1

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMBELLTOWN, NSW

Job No.: 33438A **Method:** SPIRAL AUGER **R.L. Surface:** 67.35 m

Date: 24/8/20 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** K.K.S/A.J.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						67				FILL: Silty clay, medium plasticity, brown, trace of fine grained sub angular igneous gravel, and root fibres.	w<PL			GRASS COVER SCREEN: 0-0.4m 9.68kg NO FCF
					N = 8 3,4,4		1		CH	Silty CLAY: high plasticity, orange brown mottled grey, trace of fine grained ironstone gravel and fine grained sand.	w<PL	Hd	420 430 450	ALLUVIAL
					N = 18 6,8,10	66							500 410 450	
						65	2			END OF BOREHOLE AT 1.95 m				
						64	3							
						63	4							
						62	5							
						61	6							

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BOREHOLE LOG

Borehole No. 9 **1 / 1**

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMBELLTOWN, NSW

Job No.: 33438A **Method:** SPIRAL AUGER **R.L. Surface:** 67.48 m

Date: 24/8/20 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** K.K.S/A.J.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										FILL: Silty clay, medium plasticity, brown, trace of fine grained, igneous gravel and root fibres.				GRASS COVER
									CH	Silty CLAY: high plasticity, orange brown mottled grey, trace of root fibres and ash.	w<PL	Hd		ALLUVIAL
					N = 11 3,5,6	67	1						470 450 500	
					N = 17 3,7,10	66				as above, but trace of fine grained sand.		VSt - Hd	350 410 480	
						65	2			END OF BOREHOLE AT 1.95 m				
						64	3							
						63	4							
						62	5							
						61	6							

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BOREHOLE LOG

Borehole No. 10

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMBELLTOWN, NSW

Job No.: 33438A **Method:** SPIRAL AUGER **R.L. Surface:** 68.27 m

Date: 24/8/20 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** K.K.S/A.J.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						68				FILL: Silty clay, medium plasticity, brown, trace of root fibres.	w<PL			GRASS COVER
					N = 9 5,4,5				CH	Silty CLAY: high plasticity, orange brown mottled yellow, trace of fine grained ironstone gravel.	w<PL	Hd	530 510 550	ALLUVIAL
						67	1							
										END OF BOREHOLE AT 1.50 m				
						66	2							
						65	3							
						64	4							
						63	5							
						62	6							

ENVIRONMENTAL LOGS EXPLANATION NOTES

INTRODUCTION

These notes have been provided to amplify the environmental report in regard to classification methods, field procedures and certain matters relating to the logging of soil and rock. Not all notes are necessarily relevant to all reports.

Where geotechnical borehole logs are utilised for environmental purpose, reference should also be made to the explanatory notes included in the geotechnical report. Environmental logs are not suitable for geotechnical purposes.

The ground is a product of continuing natural and man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Environmental studies include gathering and assimilating limited facts about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such facts obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and time when the investigation was carried out.

DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726:2017 *'Geotechnical Site Investigations'*. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geoenvironmental practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached soil classification table qualified by the grading of other particles present (eg. sandy clay) as set out below:

Soil Classification	Particle Size
Clay	< 0.002mm
Silt	0.002 to 0.075mm
Sand	0.075 to 2.36mm
Gravel	2.36 to 63mm
Cobbles	63 to 200mm
Boulders	> 200mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose (VL)	< 4
Loose (L)	4 to 10
Medium dense (MD)	10 to 30
Dense (D)	30 to 50
Very Dense (VD)	> 50

Cohesive soils are classified on the basis of strength (consistency) either by use of a hand penetrometer, vane shear, laboratory testing and/or tactile engineering examination. The strength terms are defined as follows.

Classification	Unconfined Compressive Strength (kPa)	Indicative Undrained Shear Strength (kPa)
Very Soft (VS)	≤ 25	≤ 12
Soft (S)	> 25 and ≤ 50	> 12 and ≤ 25
Firm (F)	> 50 and ≤ 100	> 25 and ≤ 50
Stiff (St)	> 100 and ≤ 200	> 50 and ≤ 100
Very Stiff (VSt)	> 200 and ≤ 400	> 100 and ≤ 200
Hard (Hd)	> 400	> 200
Friable (Fr)	Strength not attainable – soil crumbles	

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'shale' is used to describe fissile mudstone, with a weakness parallel to bedding. Rocks with alternating inter-laminations of different grain size (eg. siltstone/claystone and siltstone/fine grained sandstone) are referred to as 'laminite'.

INVESTIGATION METHODS

The following is a brief summary of investigation methods currently adopted by the Company and some comments on their use and application. All methods except test pits, hand auger drilling and portable Dynamic Cone Penetrometers require the use of a mechanical rig which is commonly mounted on a truck chassis or track base.

Test Pits: These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the insitu soils and 'weaker' bedrock if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for a large excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the

structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Refusal of the hand auger can occur on a variety of materials such as obstructions within any fill, tree roots, hard clay, gravel or ironstone, cobbles and boulders, and does not necessarily indicate rock level.

Continuous Spiral Flight Augers: The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of limited reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table.

Rock Augering: Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock cuttings. This method of investigation is quick and relatively inexpensive but provides only an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

Wash Boring: The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be assessed from the cuttings, together with some information from "feel" and rate of penetration.

Mud Stabilised Drilling: Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term 'mud' encompasses a range of products ranging from bentonite to polymers. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (eg. from SPT and U50 samples) or from rock coring, etc.

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, NMLC or HQ triple tube core barrels, which give a core of about 50mm and 61mm diameter, respectively, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as NO CORE. The location of NO CORE recovery is determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the bottom of the drill run.

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils, as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289.6.3.1–2004 (R2016) *'Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Penetration Resistance of a Soil – Standard Penetration Test (SPT)'*.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63.5kg hammer with a free fall of 760mm. It is normal for the tube to be driven in three successive 150mm increments and the 'N' value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In the case where full penetration is obtained with successive blow counts for each 150mm of, say, 4, 6 and 7 blows, as

  N = 13
  4, 6, 7

- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as

  N > 30
  15, 30/40mm

The results of the test can be related empirically to the engineering properties of the soil.

A modification to the SPT is where the same driving system is used with a solid 60° tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as 'N_c' on the borehole logs, together with the number of blows per 150mm penetration.

LOGS

The borehole or test pit logs presented herein are an interpretation of the subsurface conditions, and their reliability will depend to some extent on the frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will enable the most reliable assessment, but is not always practicable or possible to justify on economic grounds. In any case, the boreholes or test pits represent only a very small sample of the total subsurface conditions.

The terms and symbols used in preparation of the logs are defined in the following pages.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than 'straight line' variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

GROUNDWATER

Where groundwater levels are measured in boreholes, there are several potential problems:

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it is left open.
- A localised perched water table may lead to an erroneous indication of the true water table.
- Water table levels will vary from time to time with seasons or recent weather changes and may not be the same at the time of construction.
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must be washed out of the hole or 'reverted' chemically if reliable water observations are to be made.

More reliable measurements can be made by installing standpipes which are read after the groundwater level has stabilised at intervals ranging from several days to perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from perched water tables or surface water.

FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (eg. bricks, steel, etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably assess the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse environmental characteristics or behaviour. If the volume and nature of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes.

LABORATORY TESTING

Laboratory testing has not been undertaken to confirm the soil classification and rock strengths indicated on the environmental logs unless noted in the report.

SYMBOL LEGENDS

SOIL


FILL


TOPSOIL


CLAY (CL, CI, CH)


SILT (ML, MH)


SAND (SP, SW)


GRAVEL (GP, GW)


SANDY CLAY (CL, CI, CH)


SILTY CLAY (CL, CI, CH)


CLAYEY SAND (SC)


SILTY SAND (SM)


GRAVELLY CLAY (CL, CI, CH)


CLAYEY GRAVEL (GC)


SANDY SILT (ML, MH)


PEAT AND HIGHLY ORGANIC SOILS (Pt)

ROCK


CONGLOMERATE


SANDSTONE


SHALE/MUDSTONE


SILTSTONE


CLAYSTONE


COAL


LAMINITE


LIMESTONE


PHYLLITE, SCHIST


TUFF


GRANITE, GABBRO


DOLERITE, DIORITE


BASALT, ANDESITE


QUARTZITE

OTHER MATERIALS


BRICKS OR PAVERS


CONCRETE


ASPHALTIC CONCRETE

CLASSIFICATION OF COARSE AND FINE GRAINED SOILS

Major Divisions		Group Symbol	Typical Names	Field Classification of Sand and Gravel	Laboratory Classification	
Coarse grained soil (more than 65% of soil excluding oversize fraction is greater than 0.075mm)	GRAVEL (more than half of coarse fraction is larger than 2.36mm	GW	Gravel and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 4$ $1 < C_c < 3$
		GP	Gravel and gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		GM	Gravel-silt mixtures and gravel-sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	Fines behave as silt
		GC	Gravel-clay mixtures and gravel-sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	Fines behave as clay
	SAND (more than half of coarse fraction is smaller than 2.36mm)	SW	Sand and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 6$ $1 < C_c < 3$
		SP	Sand and gravel-sand mixtures, little or no fines	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		SM	Sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	N/A
		SC	Sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	

Major Divisions		Group Symbol	Typical Names	Field Classification of Silt and Clay			Laboratory Classification
				Dry Strength	Dilatancy	Toughness	% < 0.075mm
Fine grained soils (more than 35% of soil excluding oversize fraction is less than 0.075mm)	SILT and CLAY (low to medium plasticity)	ML	Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or silt with low plasticity	None to low	Slow to rapid	Low	Below A line
		CL, CI	Inorganic clay of low to medium plasticity, gravelly clay, sandy clay	Medium to high	None to slow	Medium	Above A line
		OL	Organic silt	Low to medium	Slow	Low	Below A line
	SILT and CLAY (high plasticity)	MH	Inorganic silt	Low to medium	None to slow	Low to medium	Below A line
		CH	Inorganic clay of high plasticity	High to very high	None	High	Above A line
		OH	Organic clay of medium to high plasticity, organic silt	Medium to high	None to very slow	Low to medium	Below A line
	Highly organic soil	Pt	Peat, highly organic soil	–	–	–	–

Laboratory Classification Criteria

A well graded coarse grained soil is one for which the coefficient of uniformity $Cu > 4$ and the coefficient of curvature $1 < C_c < 3$. Otherwise, the soil is poorly graded. These coefficients are given by:

$$C_U = \frac{D_{60}}{D_{10}} \qquad and \qquad C_C = \frac{(D_{30})^2}{D_{10}\, D_{60}}$$

Where D_{10}, D_{30} and D_{60} are those grain sizes for which 10%, 30% and 60% of the soil grains, respectively, are smaller.

NOTES:

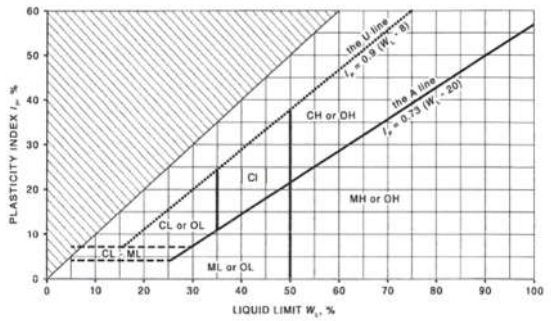
1 For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.

2 Where the grading is determined from laboratory tests, it is defined by coefficients of curvature (C_c) and uniformity (C_u) derived from the particle size distribution curve.

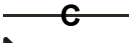
3 Clay soils with liquid limits > 35% and ≤ 50% may be classified as being of medium plasticity.

4 The U line on the Modified Casagrande Chart is an approximate upper bound for most natural soils.

Modified Casagrande Chart for Classifying Silts and Clays according to their Behaviour



LOG SYMBOLS

Log Column	Symbol	Definition
Groundwater Record		Standing water level. Time delay following completion of drilling/excavation may be shown.
		Extent of borehole/test pit collapse shortly after drilling/excavation.
		Groundwater seepage into borehole or test pit noted during drilling or excavation.
Samples	ES	Sample taken over depth indicated, for environmental analysis.
	U50	Undisturbed 50mm diameter tube sample taken over depth indicated.
	DB	Bulk disturbed sample taken over depth indicated.
	DS	Small disturbed bag sample taken over depth indicated.
	ASB	Soil sample taken over depth indicated, for asbestos analysis.
	ASS	Soil sample taken over depth indicated, for acid sulfate soil analysis.
	SAL	Soil sample taken over depth indicated, for salinity analysis.
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'Refusal' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	N_c = 5 7 3R	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration for 60° solid cone driven by SPT hammer. 'R' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	VNS = 25 PID = 100	Vane shear reading in kPa of undrained shear strength. Photoionisation detector reading in ppm (soil sample headspace test).
Moisture Condition (Fine Grained Soils)	$w > PL$ $w \approx PL$ $w < PL$ $w \approx LL$ $w > LL$	Moisture content estimated to be greater than plastic limit. Moisture content estimated to be approximately equal to plastic limit. Moisture content estimated to be less than plastic limit. Moisture content estimated to be near liquid limit. Moisture content estimated to be wet of liquid limit.
(Coarse Grained Soils)	D M W	DRY – runs freely through fingers. MOIST – does not run freely but no free water visible on soil surface. WET – free water visible on soil surface.
Strength (Consistency) Cohesive Soils	VS S F St VSt Hd Fr ( )	VERY SOFT – unconfined compressive strength ≤ 25kPa. SOFT – unconfined compressive strength > 25kPa and ≤ 50kPa. FIRM – unconfined compressive strength > 50kPa and ≤ 100kPa. STIFF – unconfined compressive strength > 100kPa and ≤ 200kPa. VERY STIFF – unconfined compressive strength > 200kPa and ≤ 400kPa. HARD – unconfined compressive strength > 400kPa. FRIABLE – strength not attainable, soil crumbles. Bracketed symbol indicates estimated consistency based on tactile examination or other assessment.
Density Index/ Relative Density (Cohesionless Soils)	VL L MD D VD ( )	**Density Index (I_D) Range (%)** / **SPT 'N' Value Range (Blows/300mm)** VERY LOOSE ≤ 15 / 0 – 4 LOOSE > 15 and ≤ 35 / 4 – 10 MEDIUM DENSE > 35 and ≤ 65 / 10 – 30 DENSE > 65 and ≤ 85 / 30 – 50 VERY DENSE > 85 / > 50 Bracketed symbol indicates estimated density based on ease of drilling or other assessment.
Hand Penetrometer Readings	300 250	Measures reading in kPa of unconfined compressive strength. Numbers indicate individual test results on representative undisturbed material unless noted otherwise.

Log Column	Symbol	Definition
Remarks	'V' bit	Hardened steel 'V' shaped bit.
	'TC' bit	Twin pronged tungsten carbide bit.
	T_{60}	Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.
	Soil Origin	The geological origin of the soil can generally be described as: RESIDUAL – soil formed directly from insitu weathering of the underlying rock. No visible structure or fabric of the parent rock. EXTREMELY WEATHERED – soil formed directly from insitu weathering of the underlying rock. Material is of soil strength but retains the structure and/or fabric of the parent rock. ALLUVIAL – soil deposited by creeks and rivers. ESTUARINE – soil deposited in coastal estuaries, including sediments caused by inflowing creeks and rivers, and tidal currents. MARINE – soil deposited in a marine environment. AEOLIAN – soil carried and deposited by wind. COLLUVIAL – soil and rock debris transported downslope by gravity, with or without the assistance of flowing water. Colluvium is usually a thick deposit formed from a landslide. The description 'slopewash' is used for thinner surficial deposits. LITTORAL – beach deposited soil.

Classification of Material Weathering

Term		Abbreviation		Definition
Residual Soil		RS		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely Weathered		XW		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.
Highly Weathered	Distinctly Weathered (Note 1)	HW	DW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately Weathered		MW		The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.
Slightly Weathered		SW		Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh		FR		Rock shows no sign of decomposition of individual minerals or colour changes.

NOTE 1: The term 'Distinctly Weathered' is used where it is not practicable to distinguish between 'Highly Weathered' and 'Moderately Weathered' rock. 'Distinctly Weathered' is defined as follows: *'Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores'*. There is some change in rock strength.

Rock Material Strength Classification

Term	Abbreviation	Uniaxial Compressive Strength (MPa)	Guide to Strength	
			Point Load Strength Index $Is_{(50)}$ (MPa)	Field Assessment
Very Low Strength	VL	0.6 to 2	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30mm thick can be broken by finger pressure.
Low Strength	L	2 to 6	0.1 to 0.3	Easily scored with a knife; indentations 1mm to 3mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium Strength	M	6 to 20	0.3 to 1	Scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High Strength	H	20 to 60	1 to 3	A piece of core 150mm long by 50mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High Strength	VH	60 to 200	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely High Strength	EH	> 200	> 10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

Appendix E: Laboratory Report(s) & COC Documents

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CERTIFICATE OF ANALYSIS 249821

Client Details

Client	Environmental Investigation Services
Attention	Harry Leonard
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E33438PL, Campbelltown**
Number of Samples	24 Soil
Date samples received	26/08/2020
Date completed instructions received	27/08/2020

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	02/09/2020
Date of Issue	31/08/2020

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Asbestos Approved By
Analysed by Asbestos Approved Identifier: Lucy Zhu
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Dragana Tomas, Senior Chemist
Jaimie Loa-Kum-Cheung, Metals Supervisor
Lucy Zhu, Asbestos Supervisor
Manju Dewendrage, Chemist
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		249821-3	249821-6	249821-9	249821-13	249821-16
Your Reference	UNITS	BH2	BH3	BH4	BH8	BH9
Depth		0-0.2	0-0.2	0.1-0.2	0-0.2	0-0.2
Date Sampled		24/08/2020	24/08/2020	25/08/2020	24/08/2020	24/08/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Date analysed	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	97	100	95	92	111

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		249821-22
Your Reference	UNITS	TS-S1
Depth		-
Date Sampled		24/08/2020
Type of sample		Soil
Date extracted	-	28/08/2020
Date analysed	-	28/08/2020
Benzene	mg/kg	120%
Toluene	mg/kg	124%
Ethylbenzene	mg/kg	124%
m+p-xylene	mg/kg	122%
o-Xylene	mg/kg	122%
Surrogate aaa-Trifluorotoluene	%	90

svTRH (C10-C40) in Soil						
Our Reference		249821-3	249821-6	249821-9	249821-13	249821-16
Your Reference	UNITS	BH2	BH3	BH4	BH8	BH9
Depth		0-0.2	0-0.2	0.1-0.2	0-0.2	0-0.2
Date Sampled		24/08/2020	24/08/2020	25/08/2020	24/08/2020	24/08/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Date analysed	-	29/08/2020	29/08/2020	29/08/2020	29/08/2020	29/08/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	104	107	105	103	105

PAHs in Soil						
Our Reference		249821-3	249821-6	249821-9	249821-13	249821-16
Your Reference	UNITS	BH2	BH3	BH4	BH8	BH9
Depth		0-0.2	0-0.2	0.1-0.2	0-0.2	0-0.2
Date Sampled		24/08/2020	24/08/2020	25/08/2020	24/08/2020	24/08/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Date analysed	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	113	114	113	109	115

Organochlorine Pesticides in soil				
Our Reference		249821-3	249821-6	249821-13
Your Reference	UNITS	BH2	BH3	BH8
Depth		0-0.2	0-0.2	0-0.2
Date Sampled		24/08/2020	24/08/2020	24/08/2020
Type of sample		Soil	Soil	Soil
Date extracted	-	28/08/2020	28/08/2020	28/08/2020
Date analysed	-	28/08/2020	28/08/2020	28/08/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	104	129	125

Organophosphorus Pesticides in Soil				
Our Reference		249821-3	249821-6	249821-13
Your Reference	UNITS	BH2	BH3	BH8
Depth		0-0.2	0-0.2	0-0.2
Date Sampled		24/08/2020	24/08/2020	24/08/2020
Type of sample		Soil	Soil	Soil
Date extracted	-	28/08/2020	28/08/2020	28/08/2020
Date analysed	-	28/08/2020	28/08/2020	28/08/2020
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	104	129	125

PCBs in Soil				
Our Reference		249821-3	249821-6	249821-13
Your Reference	UNITS	BH2	BH3	BH8
Depth		0-0.2	0-0.2	0-0.2
Date Sampled		24/08/2020	24/08/2020	24/08/2020
Type of sample		Soil	Soil	Soil
Date extracted	-	28/08/2020	28/08/2020	28/08/2020
Date analysed	-	28/08/2020	28/08/2020	28/08/2020
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	104	129	125

Acid Extractable metals in soil						
Our Reference		249821-3	249821-6	249821-9	249821-13	249821-16
Your Reference	UNITS	BH2	BH3	BH4	BH8	BH9
Depth		0-0.2	0-0.2	0.1-0.2	0-0.2	0-0.2
Date Sampled		24/08/2020	24/08/2020	25/08/2020	24/08/2020	24/08/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Date analysed	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Arsenic	mg/kg	6	8	17	8	8
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	13	15	15	18	18
Copper	mg/kg	40	31	35	19	17
Lead	mg/kg	93	60	120	37	61
Mercury	mg/kg	0.3	<0.1	0.2	<0.1	<0.1
Nickel	mg/kg	19	10	12	6	8
Zinc	mg/kg	120	73	170	34	41

Acid Extractable metals in soil		
Our Reference		249821-21
Your Reference	UNITS	SDUP1
Depth		-
Date Sampled		24/08/2020
Type of sample		Soil
Date prepared	-	28/08/2020
Date analysed	-	28/08/2020
Arsenic	mg/kg	7
Cadmium	mg/kg	<0.4
Chromium	mg/kg	14
Copper	mg/kg	50
Lead	mg/kg	160
Mercury	mg/kg	0.5
Nickel	mg/kg	20
Zinc	mg/kg	180

Moisture						
Our Reference		249821-3	249821-6	249821-9	249821-13	249821-16
Your Reference	UNITS	BH2	BH3	BH4	BH8	BH9
Depth		0-0.2	0-0.2	0.1-0.2	0-0.2	0-0.2
Date Sampled		24/08/2020	24/08/2020	25/08/2020	24/08/2020	24/08/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Date analysed	-	31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
Moisture	%	15	17	19	16	19

Moisture		
Our Reference		249821-21
Your Reference	UNITS	SDUP1
Depth		-
Date Sampled		24/08/2020
Type of sample		Soil
Date prepared	-	28/08/2020
Date analysed	-	31/08/2020
Moisture	%	17

Asbestos ID - soils NEPM - ASB-001		
Our Reference		249821-3
Your Reference	UNITS	BH2
Depth		0-0.2
Date Sampled		24/08/2020
Type of sample		Soil
Date analysed	-	28/08/2020
Sample mass tested	g	733.18
Sample Description	-	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected
ACM >7mm Estimation*	g	–
FA and AF Estimation*	g	–
ACM >7mm Estimation*	%(w/w)	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001

Asbestos ID - materials		
Our Reference		249821-23
Your Reference	UNITS	BH2-F1
Depth		0-0.5
Date Sampled		24/08/2020
Type of sample		Soil
Date analysed	-	28/08/2020
Mass / Dimension of Sample	-	50x31x4mm
Sample Description	-	Grey fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected
Trace Analysis	-	[NT]

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.

Method ID	Methodology Summary
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	249821-6
Date extracted	-			28/08/2020	3	28/08/2020	28/08/2020		28/08/2020	28/08/2020
Date analysed	-			28/08/2020	3	28/08/2020	28/08/2020		28/08/2020	28/08/2020
TRH C_6 - C_9	mg/kg	25	Org-023	<25	3	<25	<25	0	88	89
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	3	<25	<25	0	88	89
Benzene	mg/kg	0.2	Org-023	<0.2	3	<0.2	<0.2	0	99	96
Toluene	mg/kg	0.5	Org-023	<0.5	3	<0.5	<0.5	0	85	91
Ethylbenzene	mg/kg	1	Org-023	<1	3	<1	<1	0	82	81
m+p-xylene	mg/kg	2	Org-023	<2	3	<2	<2	0	88	89
o-Xylene	mg/kg	1	Org-023	<1	3	<1	<1	0	82	85
naphthalene	mg/kg	1	Org-023	<1	3	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	111	3	97	105	8	109	104

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	249821-6
Date extracted	-			28/08/2020	3	28/08/2020	28/08/2020		28/08/2020	28/08/2020
Date analysed	-			28/08/2020	3	29/08/2020	29/08/2020		29/08/2020	29/08/2020
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	3	<50	<50	0	121	101
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	3	<100	<100	0	113	94
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	3	<100	<100	0	108	119
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	3	<50	<50	0	121	101
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	3	<100	<100	0	113	94
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	3	<100	<100	0	108	119
Surrogate o-Terphenyl	%		Org-020	107	3	104	105	1	124	107

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	249821-6
Date extracted	-			28/08/2020	3	28/08/2020	28/08/2020		28/08/2020	28/08/2020
Date analysed	-			28/08/2020	3	28/08/2020	28/08/2020		28/08/2020	28/08/2020
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	106	99
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	103	92
Fluorene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	98	93
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	103	97
Anthracene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	98	93
Pyrene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	98	95
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	102	96
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	3	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	3	<0.05	<0.05	0	97	95
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	115	3	113	125	10	108	109

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	249821-6
Date extracted	-			28/08/2020	3	28/08/2020	28/08/2020		28/08/2020	28/08/2020
Date analysed	-			28/08/2020	3	28/08/2020	28/08/2020		28/08/2020	28/08/2020
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	101	94
HCB	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	96	87
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	93	83
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	105	97
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	95	90
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	96	91
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	97	93
Endrin	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	91	80
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	86	83
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	101	114
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	99	3	104	113	8	98	126

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	249821-6
Date extracted	-			28/08/2020	3	28/08/2020	28/08/2020		28/08/2020	28/08/2020
Date analysed	-			28/08/2020	3	28/08/2020	28/08/2020		28/08/2020	28/08/2020
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	96	100
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	91	91
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	107	95
Malathion	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	108	118
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	99	111
Parathion	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	88	98
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	89	109
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	99	3	104	113	8	98	126

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	249821-6
Date extracted	-			28/08/2020	3	28/08/2020	28/08/2020		28/08/2020	28/08/2020
Date analysed	-			28/08/2020	3	28/08/2020	28/08/2020		28/08/2020	28/08/2020
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	3	<0.1	<0.1	0	108	100
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	99	3	104	113	8	98	126

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	249821-6
Date prepared	-			28/08/2020	3	28/08/2020	28/08/2020		28/08/2020	28/08/2020
Date analysed	-			28/08/2020	3	28/08/2020	28/08/2020		28/08/2020	28/08/2020
Arsenic	mg/kg	4	Metals-020	<4	3	6	7	15	110	77
Cadmium	mg/kg	0.4	Metals-020	<0.4	3	<0.4	<0.4	0	101	81
Chromium	mg/kg	1	Metals-020	<1	3	13	12	8	104	75
Copper	mg/kg	1	Metals-020	<1	3	40	42	5	108	87
Lead	mg/kg	1	Metals-020	<1	3	93	110	17	107	#
Mercury	mg/kg	0.1	Metals-021	<0.1	3	0.3	0.4	29	120	84
Nickel	mg/kg	1	Metals-020	<1	3	19	16	17	107	76
Zinc	mg/kg	1	Metals-020	<1	3	120	170	34	107	#

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

8 metals in soil - # Percent recovery is not possible to report due to the inhomogeneous nature of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

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SAMPLE RECEIPT ADVICE

Client Details

Client	Environmental Investigation Services
Attention	Harry Leonard

Sample Login Details

Your reference	E33438PL, Campbelltown
Envirolab Reference	249821
Date Sample Received	26/08/2020
Date Instructions Received	27/08/2020
Date Results Expected to be Reported	02/09/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	24 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	17.1
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

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Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
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12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM - ASB-001	Asbestos ID - materials	On Hold
BH1-0.1-0.2										✓
BH1-0.5-0.6										✓
BH2-0-0.2	✓	✓	✓	✓	✓	✓	✓	✓		
BH2-0.7-0.95										✓
BH2-1.7-1.95										✓
BH3-0-0.2	✓	✓	✓	✓	✓	✓	✓			
BH3-0.5-0.7										✓
BH3-1.5-1.95										✓
BH4-0.1-0.2	✓	✓	✓				✓			
BH4-0.5-0.6										✓
BH7-0.1-0.2										✓
BH7-0.5-0.6										✓
BH8-0-0.2	✓	✓	✓	✓	✓	✓	✓			
BH8-0.6-0.95										✓
BH8-1.7-1.95										✓
BH9-0-0.2	✓	✓	✓				✓			
BH9-0.7-0.95										✓
BH9-1.7-1.95										✓
BH10-0.1-0.2										✓
BH10-0.5-0.6										✓
SDUP1							✓			
TS-S1	✓									
BH2-F1-0-0.5									✓	
SDUP2										✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

SAMPLE AND CHAIN OF CUSTODY FORM

TO:
ENVIROLAB SERVICES PTY LTD
12 ASHLEY STREET
CHATSWOOD NSW 2067
P: (02) 99106200
F: (02) 99106201

Attention: Aileen

JKE Job Number: E33438PL
Date Results Required: STANDARD
Page: 1 of 1

FROM:
JKEnvironments
REAR OF 115 WICKS ROAD
MACQUARIE PARK, NSW 2113
P: 02-9888 5000 F: 02-9888 5001
Attention: Harry Leonard
hleonard@jkenvironments.com.au

Location: Campbelltown
Sampler: HW/KKS

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 2	Combo 3a	Combo 6	Combo 3	8 Metals	PAHs	TRH/BTEX	BTEX	Asbestos	WA Asbestos (500mL)
25.08.20	1	BH1	0.1-0.2	G, A	1.2	F: silty clay										
25.08.20	2	BH1	0.5-0.6	G, A	0.1	Silty clay										
24.08.20	3	BH2	0-0.2	G, A1	0	F: silty clay			X							X
24.08.20	4	BH2	0.7-0.95	G, A	33.5	Silty clay										
24.08.20	5	BH2	1.7-1.95	G, A	0.1	Silty clay										
24.08.20	6	BH3	0-0.2	G, A	0.2	F: silty clay			X							
24.08.20	7	BH3	0.5-0.7	G, A	0	Silty clay										
24.08.20	8	BH3	1.5-1.95	G, A	0.1	Silty clay										
25.08.20	9	BH4	0.1-0.2	G, A	0.1	F: silty clay				X						
25.08.20	10	BH4	0.5-0.6	G, A	0.1	Silty clay										
25.08.20	11	BH7	0.1-0.2	G, A	0.4	F: silty clay										
25.08.20	12	BH7	0.5-0.6	G, A	0.1	Silty clay										
24.08.20	13	BH8	0-0.2	G, A	7.2	F: silty clay			X							
24.08.20	14	BH8	0.6-0.95	G, A	0.1	Silty clay										
24.08.20	15	BH8	1.7-1.95	G, A	0.1	Silty clay										
24.08.20	16	BH9	0-0.2	G, A	0.1	F: silty clay				X						
24.08.20	17	BH9	0.7-0.95	G, A	0	Silty clay										
24.08.20	18	BH9	1.7-1.95	G, A	0	Silty clay										
24.08.20	19	BH10	0.1-0.2	G, A	0	F: silty clay										
24.08.20	20	BH10	0.5-0.6	G, A	0	Silty clay										
24.08.20	21	SDUP1	-	G	NA	Soil duplicate					X					
24.08.20	-	SDUP2	-	G	NA	Soil duplicate										
24.08.20	22	TS-S1	-	V	NA	Soil spike								X		
24.08.20	23 AR	BH2-F1	0-0.5	A	NA	Material									X	

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 249821
Date Received: 26-8-20
Time Received: 13:17
Received by: MO
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

12.8g

Remarks (comments/detection limits required):
SDUP1 – Intra-lab duplicate.

Sample Containers:
G - 250mg Glass Jar V - BTEX Vial
A - 40g Ziplock Asbestos Bag
A1 - 500mL Ziplock Asbestos Bag

Relinquished By:	Date:	Time:	Received By:	Date:
[signature]	26/8/2020.			

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 249821-A

Client Details

Client	Environmental Investigation Services
Attention	Harry Leonard
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E33438PL, Campbelltown**
Number of Samples	24 Soil
Date samples received	26/08/2020
Date completed instructions received	07/09/2020

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	14/09/2020
Date of Issue	11/09/2020

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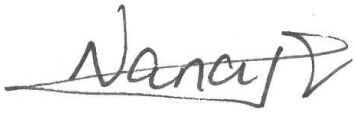
Results Approved By
Loren Bardwell, Senior Chemist

Authorised By



Nancy Zhang, Laboratory Manager

Metals in TCLP USEPA1311				
Our Reference		249821-A-3	249821-A-9	249821-A-21
Your Reference	UNITS	BH2	BH4	SDUP1
Depth		0-0.2	0.1-0.2	-
Date Sampled		24/08/2020	25/08/2020	24/08/2020
Type of sample		Soil	Soil	Soil
Date extracted	-	10/09/2020	10/09/2020	10/09/2020
Date analysed	-	10/09/2020	10/09/2020	10/09/2020
pH of soil for fluid# determ.	pH units	7.0	6.9	7.6
pH of soil TCLP (after HCl)	pH units	1.7	1.7	1.8
Extraction fluid used	-	1	1	1
pH of final Leachate	pH units	5.0	5.0	5.1
Lead in TCLP	mg/L	<0.03	<0.03	<0.03

Method ID	Methodology Summary
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using in house method INORG-004. Please note that the mass used may be scaled down from the default based on sample mass available.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

QUALITY CONTROL: Metals in TCLP USEPA1311						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			10/09/2020	3	10/09/2020	10/09/2020		10/09/2020	[NT]
Date analysed	-			10/09/2020	3	10/09/2020	10/09/2020		10/09/2020	[NT]
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	3	<0.03	<0.03	0	99	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Environmental Investigation Services
Attention	Harry Leonard

Sample Login Details

Your reference	E33438PL, Campbelltown
Envirolab Reference	249821-A
Date Sample Received	26/08/2020
Date Instructions Received	07/09/2020
Date Results Expected to be Reported	14/09/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	24 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	17.1
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	pH of soil for fluid#determ.	pH of soil TCLP (after HCl)	Extraction fluid used	pH of final Leachate	Lead in TCLP	On Hold
BH1-0.1-0.2						✓
BH1-0.5-0.6						✓
BH2-0-0.2	✓	✓	✓	✓	✓	
BH2-0.7-0.95						✓
BH2-1.7-1.95						✓
BH3-0-0.2						✓
BH3-0.5-0.7						✓
BH3-1.5-1.95						✓
BH4-0.1-0.2	✓	✓	✓	✓	✓	
BH4-0.5-0.6						✓
BH7-0.1-0.2						✓
BH7-0.5-0.6						✓
BH8-0-0.2						✓
BH8-0.6-0.95						✓
BH8-1.7-1.95						✓
BH9-0-0.2						✓
BH9-0.7-0.95						✓
BH9-1.7-1.95						✓
BH10-0.1-0.2						✓
BH10-0.5-0.6						✓
SDUP1	✓	✓	✓	✓	✓	
TS-S1						✓
BH2-F1-0-0.5						✓
SDUP2						✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Ming To

From: Ken Nguyen
Sent: Monday, 7 September 2020 12:21 PM
To: Ming To.
Subject: FW: Results for Registration 249821 E33438PL, Campbelltown

Ref: 249821-A
TAT: Standard
Due: 14/09/2020.

From: Harry Leonard <HLeonard@jkenvironments.com.au>
Sent: Monday, 7 September 2020 7:30 AM
To: Customer Service <customerservice@envirolab.com.au>
Cc: Ken Nguyen <KNguyen@envirolab.com.au>
Subject: RE: Results for Registration 249821 E33438PL, Campbelltown

Good morning,

Could I please book the following samples for TCLP lead analysis:

- 3 BH2 (0-0.2);
- 9 BH4 (0.1-0.2); and
- 21 SDUP1

Any issues, please let me know. Thank you.

Regards
Harry Leonard
Senior Environmental Scientist
NSW Licensed Asbestos Assessor

JK Group is open for business. Should you wish to speak to us, then please contact us by mobile phone rather than the landline as most staff are working from home.

T: +612 9888 5000
D: 0403 007 650
E: HLeonard@jkenvironments.com.au
www.jkenvironments.com.au

PO Box 976
NORTH RYDE BC NSW 1670
115 Wicks Road
MACQUARIE PARK NSW 2113

JKEnvironments

From: Ken Nguyen <KNguyen@envirolab.com.au>
Sent: Monday, 31 August 2020 7:03 PM

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 249821-B

Client Details

Client	Environmental Investigation Services
Attention	Brendan Page
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E33438PL, Campbelltown**
Number of Samples	24 Soil
Date samples received	26/08/2020
Date completed instructions received	22/09/2020

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	24/09/2020
Date of Issue	23/09/2020

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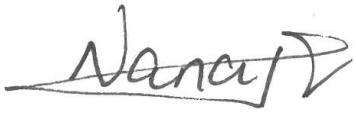
Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Asbestos Approved By
Analysed by Asbestos Approved Identifier: Lucy Zhu
Authorised by Asbestos Approved Signatory: Lucy Zhu
Results Approved By
Lucy Zhu, Asbestos Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

Asbestos ID - soils						
Our Reference		249821-B-1	249821-B-6	249821-B-9	249821-B-11	249821-B-13
Your Reference	UNITS	BH1	BH3	BH4	BH7	BH8
Depth		0.1-0.2	0-0.2	0.1-0.2	0.1-0.2	0-0.2
Date Sampled		25/08/2020	24/08/2020	25/08/2020	25/08/2020	24/08/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	23/09/2020	23/09/2020	23/09/2020	23/09/2020	23/09/2020
Sample mass tested	g	Approx. 30g	Approx. 10g	Approx. 30g	30.73g	Approx. 35g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	Chrysotile asbestos detected Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils			
Our Reference		249821-B-16	249821-B-19
Your Reference	UNITS	BH9	BH10
Depth		0-0.2	0.1-0.2
Date Sampled		24/08/2020	24/08/2020
Type of sample		Soil	Soil
Date analysed	-	23/09/2020	23/09/2020
Sample mass tested	g	Approx. 25g	Approx. 40g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Report Comments

Sample 249821-B-11; Chrysotile asbestos identified in matted material, it is estimated to be 0.11g/kg in 30.73g of soil (i.e. > reporting limit for the method of 0.1g/kg).

Envirolab Services Pty Ltd
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ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Environmental Investigation Services
Attention	Brendan Page

Sample Login Details

Your reference	E33438PL, Campbelltown
Envirolab Reference	249821-B
Date Sample Received	26/08/2020
Date Instructions Received	22/09/2020
Date Results Expected to be Reported	24/09/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	24 Soil
Turnaround Time Requested	2 days
Temperature on Receipt (°C)	17.1
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	Asbestos ID - soils	On Hold
BH1-0.1-0.2	✓	
BH1-0.5-0.6		✓
BH2-0-0.2		✓
BH2-0.7-0.95		✓
BH2-1.7-1.95		✓
BH3-0-0.2	✓	
BH3-0.5-0.7		✓
BH3-1.5-1.95		✓
BH4-0.1-0.2	✓	
BH4-0.5-0.6		✓
BH7-0.1-0.2	✓	
BH7-0.5-0.6		✓
BH8-0-0.2	✓	
BH8-0.6-0.95		✓
BH8-1.7-1.95		✓
BH9-0-0.2	✓	
BH9-0.7-0.95		✓
BH9-1.7-1.95		✓
BH10-0.1-0.2	✓	
BH10-0.5-0.6		✓
SDUP1		✓
TS-S1		✓
BH2-F1-0-0.5		✓
SDUP2		✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Andrew (Fitzy) Fitzsimons

From: Brendan Page <BPage@jkenvironments.com.au>
Sent: Tuesday, 22 September 2020 4:03 PM
To: Samplereceipt
Cc: Harry Leonard
Subject: Additional analysis 249821 (our ref E33438PL Campbelltown)
Attachments: 249821-COC.pdf

249821-B
Due: 24/9/20

Follow Up Flag: Follow up
Flag Status: Flagged

Hi,

Could we please request asbestos analysis (AS – detect/non-detect) on the following soil samples in Envirolab's custody:

BH1 0.1-0.2 – 1
BH3 0-0.2 – 6
BH4 0.1-0.2 – 9
BH7 0.1-0.2 – 11
BH8 0-0.2 – 13
BH9 0-0.2 – 16
BH10 0.1-0.2 – 19

We require the results before 5pm on Thursday 24th of September.

Please confirm the accelerated turnaround surcharge % for our records.

Thank you

Regards
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JK Group is open for business. Should you wish to speak to us, then please contact us by mobile phone rather than the landline as most staff are working from home.

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Appendix F: Report Explanatory Notes

QA/QC Definitions

The QA/QC terms used in this report are defined below. The definitions are in accordance with US EPA publication SW-846, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (1994)[18] methods and those described in *Environmental Sampling and Analysis, A Practical Guide,* (1991)[19]. The NEPM (2013) is consistent with these documents.

A. Practical Quantitation Limit (PQL), Limit of Reporting (LOR) & Estimated Quantitation Limit (EQL)

These terms all refer to the concentration above which results can be expressed with a minimum 95% confidence level. The laboratory reporting limits are generally set at ten times the standard deviation for the Method Detection Limit for each specific analyte. For the purposes of this report the LOR, PQL, and EQL are considered to be equivalent.

When assessing laboratory data it should be borne in mind that values at or near the PQL have two important limitations: *"The uncertainty of the measurement value can approach, and even equal, the reported value. Secondly, confirmation of the analytes reported is virtually impossible unless identification uses highly selective methods. These issues diminish when reliably measurable amounts of analytes are present. Accordingly, legal and regulatory actions should be limited to data at or above the reliable detection limit*" (Keith, 1991).

B. Precision

The degree to which data generated from repeated measurements differ from one another due to random errors. Precision is measured using the standard deviation or Relative Percent Difference (RPD).

C. Accuracy

Accuracy is a measure of the agreement between an experimental result and the true value of the parameter being measured (i.e. the proximity of an averaged result to the true value, where all random errors have been statistically removed). The assessment of accuracy for an analysis can be achieved through the analysis of known reference materials or assessed by the analysis of surrogates, field blanks, trip spikes and matrix spikes. Accuracy is typically reported as percent recovery.

D. Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is primarily dependent upon the design and implementation of the sampling program. Representativeness of the data is partially ensured by the avoidance of contamination, adherence to sample handing and analysis protocols and use of proper chain-of-custody and documentation procedures.

E. Completeness

Completeness is a measure of the number of valid measurements in a data set compared to the total number of measurements made and overall performance against DQIs. The following information is assessed for completeness:

- Chain-of-custody forms;
- Sample receipt form;
- All sample results reported;
- All blank data reported;

[18] US EPA, (1994). *SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* (US EPA SW-846)

[19] Keith., H, (1991). *Environmental Sampling and Analysis, A Practical Guide*

- All laboratory duplicate and RPDs calculated;
- All surrogate spike data reported;
- All matrix spike and lab control spike (LCS) data reported and RPDs calculated;
- Spike recovery acceptable limits reported; and
- NATA stamp on reports.

F. Comparability

Comparability is the evaluation of the similarity of conditions (e.g. sample depth, sample homogeneity) under which separate sets of data are produced. Data comparability checks include a bias assessment that may arise from the following sources:

- Collection and analysis of samples by different personnel; Use of different techniques;
- Collection and analysis by the same personnel using the same methods but at different times; and
- Spatial and temporal changes (due to environmental dynamics).

G. Blanks

The purpose of laboratory and field blanks is to check for artefacts and interferences that may arise during sampling, transport and analysis.

H. Matrix Spikes

Samples are spiked with laboratory grade standards to detect interactive effects between the sample matrix and the analytes being measured. Matrix Spikes are reported as a percent recovery and are prepared for 1 in every 20 samples. Sample batches that contain less than 20 samples may be reported with a Matrix Spike from another batch. The percent recovery is calculated using the formula below. Acceptable recovery limits are 70% to 130%.

$$\frac{\text{(Spike Sample Result – Sample Result) x 100}}{\text{Concentration of Spike Added}}$$

I. Surrogate Spikes

Samples are spiked with a known concentration of compounds that are chemically related to the analyte being investigated but unlikely to be detected in the environment. The purpose of the Surrogate Spikes is to check the accuracy of the analytical technique. Surrogate Spikes are reported as percent recovery.

J. Duplicates

Laboratory duplicates measure precision, expressed as Relative Percent Difference. Duplicates are prepared from a single field sample and analysed as two separate extraction procedures in the laboratory. The RPD is calculated using the formula where D1 is the sample concentration and D2 is the duplicate sample concentration:

$$\frac{(D1 - D2) \times 100}{\{(D1 + D2)/2\}}$$

Appendix G: Data (QA/QC) Evaluation

Data (QA/QC) Evaluation

A. INTRODUCTION

This Data (QA/QC) Evaluation forms part of the validation process for the DQOs documented in Section 6.1 of this report. Checks were made to assess the data in terms of precision, accuracy, representativeness, comparability and completeness. These 'PARCC' parameters are referred to collectively as DQIs and are defined in the Report Explanatory Notes attached in the report appendices.

1. Field and Laboratory Considerations

The quality of the analytical data produced for this project has been considered in relation to the following:

- Sample collection, storage, transport and analysis;
- Laboratory PQLs;
- Field QA/QC results; and
- Laboratory QA/QC results.

2. Field QA/QC Samples and Analysis

A summary of the field QA/QC samples collected and analysed for this investigation is provided in the following table:

Sample Type	Sample Identification	Frequency (of Sample Type)	Analysis Performed
Intra-laboratory duplicate (soil)	SDUP1 (primary sample BH8 0-0.2m)	Approximately 20% of primary samples	Heavy metals
Trip spike (soil)	TS-S1 (25/08/2020)	One for the investigation to demonstrate adequacy of preservation, storage and transport methods	BTEX

The results for the field QA/QC samples are detailed in the laboratory summary tables (Table Q1) attached to the investigation report and are discussed in the subsequent sections of this Data (QA/QC) Evaluation report.

3. Data Assessment Criteria

JKE adopted the following criteria for assessing the field and laboratory QA/QC analytical results

Field Duplicates

Acceptable targets for precision of field duplicates in this report will be 30% or less, consistent with NEPM (2013). RPD failures will be considered qualitatively on a case-by-case basis taking into account factors such as the concentrations used to calculate the RPD (i.e. RPD exceedance where concentrations are close to the PQL are typically not as significant as those where concentrations are reported at least five or 10 times the PQL), sample type, collection methods and the specific analyte where the RPD exceedance was reported.

Trip Spikes
Acceptable targets for trip spike samples in this report will be 70% to 130%.

Laboratory QA/QC
The suitability of the laboratory data is assessed against the laboratory QA/QC criteria which is outlined in the laboratory reports. These criteria were developed and implemented in accordance with the laboratory's NATA accreditation and align with the acceptable limits for QA/QC samples as outlined in NEPM (2013) and other relevant guidelines.

A summary of the acceptable limits adopted by the primary laboratory (Envirolab) is provided below:

RPDs
- Results that are <5 times the PQL, any RPD is acceptable; and
- Results >5 times the PQL, RPDs between 0-50% are acceptable.

Laboratory Control Samples (LCS) and Matrix Spikes
- 70-130% recovery acceptable for metals and inorganics;
- 60-140% recovery acceptable for organics; and
- 10-140% recovery acceptable for VOCs.

Surrogate Spikes
- 60-140% recovery acceptable for general organics; and
- 10-140% recovery acceptable for VOCs.

Method Blanks
- All results less than PQL.

B. DATA EVALUATION

1. Sample Collection, Storage, Transport and Analysis

Samples were collected by trained field staff in accordance. Field sampling procedures were designed to be consistent with relevant guidelines, including NEPM (2013) and other guidelines made under the CLM Act 1997.

Appropriate sample preservation, handling and storage procedures were adopted. Laboratory analysis was undertaken within specified holding times generally in accordance with Schedule B(3) of NEPM (2013) and the laboratory NATA accredited methodologies.

JKE note that the temperature on receipt of soil samples was reported to be up to 17.1°C. JKE understand that the temperature is measured at the laboratory using an infrared temperature probe by scanning the outside of the sample container (i.e. one sample jar/container at the time of registering the samples). This procedure is not considered to be robust as there is a potential for the outside of the jar to warm to ambient temperature, or at least to increase from that of the internal contents, relatively quickly. On this basis, JKE are of the opinion that the temperatures reported on the Sample Receipts are unlikely to be reliable or

representative of the overall batch. This is further supported by the trip spike recovery results (discussed further below) which reported adequate recovery in the range of 120% to 124%.

Envirolab noted that the asbestos results were reported to be consistent with the recommendations in NEPM (2013), however this level of reporting is outside the scope of their NATA accreditation. In the absence of other available analytical methods for asbestos, this was found to be acceptable for the purpose of this investigation.

Review of the project data also indicated that:

- COC documentation was adequately maintained;
- Sample receipt advice documentation was provided for all sample batches;
- All analytical results were reported; and
- Consistent units were used to report the analysis results.

2. Laboratory PQLs

Appropriate PQLs were adopted for the analysis and all PQLs were below the SAC.

3. Field QA/QC Sample Results

Field Duplicates

The results indicated that field precision was acceptable. Elevated RPDs were reported for several heavy metals in SDUP1/BH2 (0-0.2m). As both the primary and duplicate sample results were less than the SAC, the exceedances are not considered to have had an adverse impact on the data set as a whole. The results suggest there is heterogeneity in the fill.

Trip Spikes

The results ranged from 120% to 124% and indicated that field preservation methods were appropriate.

4. Laboratory QA/QC

The analytical methods implemented by the laboratory were performed in accordance with their NATA accreditation and were consistent with Schedule B(3) of NEPM (2013). The frequency of data reported for the laboratory QA/QC (i.e. duplicates, spikes, blanks, LCS) was considered to be acceptable for the purpose of this investigation.

A review of the laboratory QA/QC data identified the following minor non-conformance:

- Percent recovery was not possible for some heavy metals in soil due to the inhomogeneous nature of the elements in the samples. However, an acceptable recovery was obtained for the laboratory control sample. This is not considered to impact the reported analysis findings.

C. DATA QUALITY SUMMARY

JKE are of the opinion that the data are adequately precise, accurate, representative, comparable and complete to serve as a basis for interpretation to achieve the investigation objectives.

Non-conformances were reported for some field QA/QC samples and laboratory QA/QC analysis. These non-conformances were considered to be sporadic and minor, and were not considered to be indicative of

systematic sampling or analytical errors. On this basis, these non-conformances are not considered to materially impact the report findings.

Appendix H: Guidelines and Reference Documents

Acid Sulfate Soils Management Advisory Committee (ASSMAC), (1998). Acid Sulfate Soils Manual

Australian and New Zealand Environment Conservation Council (ANZECC), (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality

Canadian Council of Ministers of the Environment, (1999). Canadian soil quality guidelines for the protection of environmental and human health: Benzo(a)Pyrene (1997)

CRC Care, (2011). Technical Report No. 10 – Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document

Contaminated Land Management Act 1997 (NSW)

Department of Land and Water Conservation, (1997). 1:25,000 Acid Sulfate Soil Risk Map Series

Managing Land Contamination, Planning Guidelines SEPP55 – Remediation of Land (1998)

National Health and Medical Research Council (NHMRC), (2018). National Water Quality Management Strategy, Australian Drinking Water Guidelines 2011

NSW Department of Environment and Conservation, (2007). Guidelines for the Assessment and Management of Groundwater Contamination

NSW EPA, (1995). Contaminated Sites Sampling Design Guidelines

NSW EPA, (2014). Waste Classification Guidelines - Part 1: Classifying Waste

NSW EPA, (2015). Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997

NSW EPA, (2017). Guidelines for the NSW Site Auditor Scheme, 3rd Edition

NSW EPA, (2020). Consultants Reporting on Contaminated Land, Contaminated Land Guidelines

National Environment Protection Council (NEPC), (2013). National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)

Olszowy, H., Torr, P., and Imray, P., (1995). Trace Element Concentrations in Soils from Rural and Urban Areas of Australia. Contaminated Sites Monograph Series No. 4. Department of Human Services and Health, Environment Protection Agency, and South Australian Health Commission

Protection of the Environment Operations Act 1997 (NSW)

State Environmental Planning Policy No.55 – Remediation of Land 1998 (NSW)

World Health Organisation (WHO), (2008). Petroleum Products in Drinking-water, Background document for the development of WHO Guidelines for Drinking Water Quality

Western Australia Department of Health, (2009). Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia